The Iron Age

A Review of the Hardware and Metal Trades.

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Improved Drawing Press.

We show in the accompanying illustration a No. 3 drawing press, manufactured by the enterprising firm of Bliss & Williams, 167 to 173 Plymouth street, Brooklyn. It is a machine of great practical utility in the manufacture of a large class of sheet metal goods. Its weight complete is 6300 pounds. The opening in the bed plate is 11 inches in diameter. When at the top of its stroke, the blank holder is 8 inches from the bed, and the stroke of the blank holder is 3 inches. This, as will be seen, holds the blank under spring pressure, so that in the event of irregularity in the thickness of the metal stamped, there is no danger of injury to the machine. The punch has a stroke of 6 inches, and the press is heavy enough and large enough to receive a blank 15 inches in diameter, and take it down 3 inches at a single pass. Pans, wash bowls, &c., may be finished up 11 inches in diameter. Two blanks may be taken down at a time. The dimensions of the press are easily calculated, as our engraving is made to scale, three-quarters inch to the foot. The balance wheel is 37 inches diameter, weighs 600 pounds, and is intended to run 175 revolutions per minute. The press is geared 6 to 1, and the driving pulley is 20 inches diameter, with 5 inch face. This press is also made in a smaller size. It is very strong and convenient, will do a wide range of work, and is finished in a manner altogether satisfactory. The policy of the manufacturers is not to waste time in finishing up parts which can be left rough, but the nuts, bearing and small wearing parts are hardened or made of cast steel, as circumstances may require. There is considerable foreign, as well as home, demand for this class of machines, and they are appreciated wherever introduced.

The Pennsylvania Steel Works.

The *Token of Progress*, published at Baldwin, Pa., gives an account of the manufacture of rails at the Pennsylvania Steel Works, at that place, from which we condense the following: About 33 per cent. of the metal used is iron manufactured in Western Pennsylvania from Lake Superior ore, about 20 per cent. is made at the Baldwin Furnace, about 40 per cent. comes from anthracite furnaces in the neighborhood of the works, and the balance is spiegeleisen from Germany or other countries in Europe.

Following the pig metal that is being drawn into the Bessemer mills, we reach four large cupola furnaces. Two of these are in use at one time (the other two being reserved for a change), and they melt about 250 tons in twenty-four hours. From the cupolas the molten metal is tapped every fifteen minutes into a ladle capable of holding 24,000 pounds. This ladle is raised by hydraulic pressure, and is so arranged as to weigh the metal while pouring it into large egg shaped vessels called converters. Each of the converters has in its bottom thirteen tuyeres, and there are twelve three-eight holes in each tuyere.

The converter lies on its side while the molten metal is being poured into it, so that the metal may not run down its holes in its bottom; but as soon as the required quantity has been run in, the converter assumes a perpendicular position, a blast of cold air, with a pressure of 25 pounds to the square inch being let on at the same moment. The molten metal lies about 15 inches deep on the bottom of the converter, but the strength of the blast prevents it from sinking through the tuyeres. The blast, which is furnished by two engines of 350 horse-power each, is kept up on an average about 18 minutes.

From the converter the steel is run into the "steel ladle," whence it passes through a nozzle in the bottom to a sand-lined tube called a sprue, and thence flows through channels in the top of a flask into cast iron molds, where it is formed into ingots. This mode of casting is known as the bottom cast. Each charge makes eight ingots and each ingot two rails. Ingots of various weights are made, according to the weight of the rail required, but all the ingots of one charge are alike in size.

As soon as the ingot loosens itself from the mold by contraction in cooling, the mold is stripped off. Both molds and ingots are manipulated by four 8 ton hydraulic cranes, whose power is derived from two Worthington pumps that furnish a pressure of 250 pounds to the square inch. A small ingot weighing 8 or 10 pounds is detached from each charge and sent to the laboratory to be tested for carbon by the chemist. Every charge is numbered, a corresponding number put on every rail made from it, with the year in which it was made and the brand of the company.

Thus each year has its record, and if any one were taken out of the track 20 years after it had been laid down, and the number on it given to the steel company, they could tell precisely the material used in making it, the day it was cast and rolled, and the conditions under which it was manufactured.

Generally, though not always, after the molds are stripped off, the ingots are passed in a red or nearly red-hot condition to the forge department. Here they are put in furnaces and heated to a white heat. They are then put under a 14-ton hammer, and hammered to a square of 7 inches, when they are cut through, each ingot making two blooms. This hammer has a maximum force of 200 tons, and is so well regulated that it can hammer steel from the largest size down to 2½ inches square. It is claimed that it has done as much work in one year as has been done in that period of time by any three hammers of the same capacity in England. The anvil block weighs 200 tons.

There are two other hammers in this department. One of these weighs seven tons. It has a longer stroke than the large hammer, and, therefore, delivers a heavier blow (170 tons) in proportion to weight. The other is a 2 ton hammer for merchant work. Heavy shaft heads are made here for steam vessels, and all kinds of forging is done, both straight or shaped. There are eight furnaces in this department, each, with one exception, capable of heating six ingots at a time. The two large hammers are producing from 200 to 230 tons of finished blooms per day.

It is claimed that the great advantage of this process is that the rails are made from hammered blooms, instead of by blooming mills. Sir John Brown, of England, whose steel was so long regarded as unequalled in quality, and who furnished a large quantity of the best rails ever brought to this country, gained his reputation by this hammering process.

From the forge the blooms go to the rail mill, where they are reheated and rolled. Here there are eight furnaces, five of which are now working. Three of the five are gas, and two coal furnaces. Each gas furnace heats 18 blooms at a charge, and each coal furnace eight. The gas furnaces are making 12 heats each per day, and the other ten.

From the furnace the bloom goes first to the roughing rolls and then to the finishing rolls. It passes eight times through the former and nine times through the latter, diminishing in thickness and increasing in length at each passage, until it comes out a rail of the desired pattern, weight and length. Its last run through the roll draws it out to the length of about 33 feet. It is then placed under two circular saws, 30 feet 4½ inches apart, and in the twinkle of an eye both ends are cut off, leaving it exactly 30 feet long after it contracts in cooling. The rail is then placed on a straightening plate to cool. As it does not become perfectly straight, however, it is taken in hand by two men and straightened by means of a press called a cold straightener. Then holes for fastening the fish plate are drilled in it, and it is ready to fill its place in the road bed.

From one of the ends cut off a rail out of every charge a piece is taken about a foot long and an inch in thickness. This is tested by bending when cold. If it bend to an angle less than a right angle without displaying a fracture, the rails of that charge are considered first-class, and are marked and sold as such; but if it break, they are marked and sold as No. 2, and used in sidings, etc. But the manufacture has been brought to such a state of perfection that there is hardly one No. 2 charge in a thousand. From 206 to 220 tons of rails are rolled in this department every 24 hours.

There are two blast furnaces connected with the steel works, which are supplied with three engines of 500 horse-power each. One of these furnaces has been in operation two years; the other is just finishing and will be blown in soon. Both have brick stacks with iron casing. No. 1 has a stack 61 feet high and 14 feet bosh. No. 2 has a stack 65 feet high and 16 feet bosh. Each furnace has two nests of boilers with six in each nest. The three engines have an 84 inch blowing cylinder and 48 inch stroke of piston. The hot ovens of both furnaces are Kent's patent, and the hoist for taking the stock to the top of the furnaces is Heartman's air hoist.

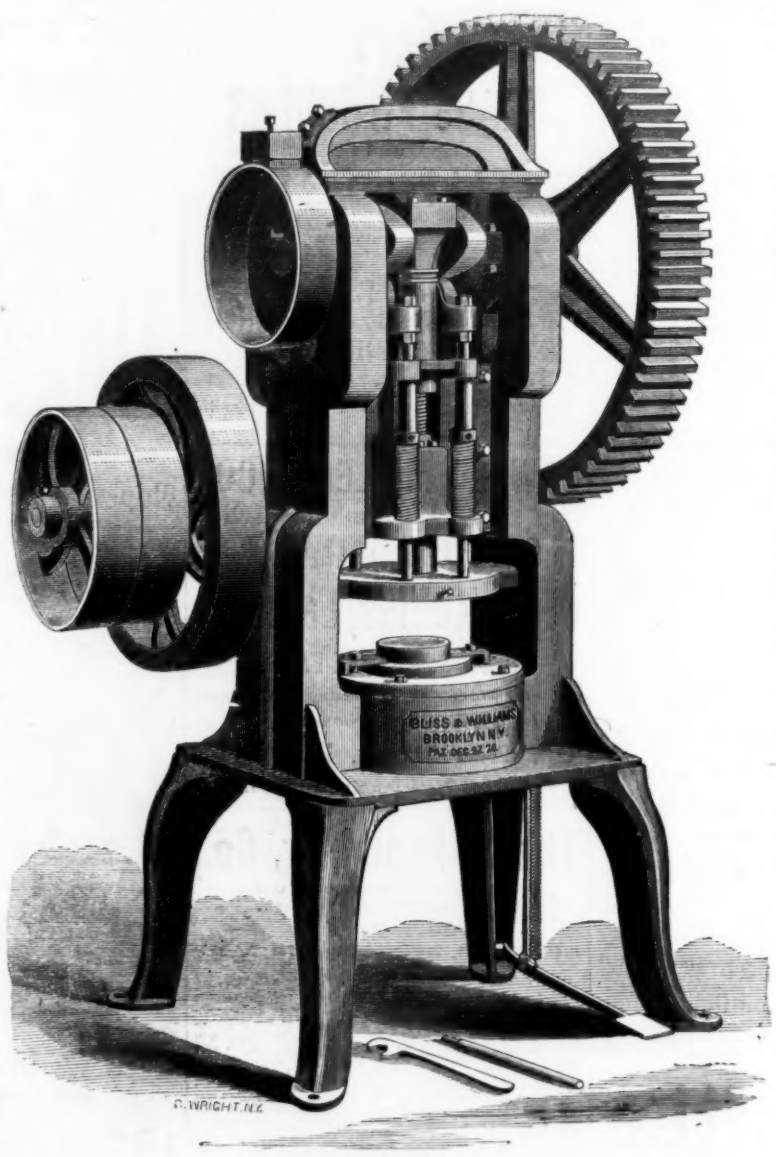
The ores used are Staten Island and New Jersey magnetites, with a very small proportion of hematitite from other places, and the product is Bessemer pig iron, of which the furnace now in blast makes from 35 to 70 tons per day. Considerable attention is paid to roasting the magnetites, track being so arranged that ore is handled but once. Both coke and anthracite coal are used, sometimes separately and sometimes mixed. Very pure limestone is obtained from hills in the immediate vicinity.

The open hearth furnace consists of two six ton Siemens-Martin or open hearth steel melting furnaces. They are of the latest and most approved form, and the first of their kind erected at Bessemer steel works in this country. They utilize the scraps of the forge and rail mills. The scraps are dissolved in a bath of melted pig iron, and the carbon is burnt off by oxygen of an iron ore, instead of by the free oxygen of the air, as in the Bessemer process. Recarbonization is effected by the use of spiegeleisen and ferro-manganese. From gas made in Siemens' producers these furnaces obtain the highest degree of heat used in metallurgy. The product is about 22 tons of steel every 24 hours.

A blooming mill is now in process of erection. It has a 34 inch roll train (said to be the largest in the world) for rolling ingots into rail blooms, instead of hammering them. The flywheel of the engine that is to drive this train weighs 70 tons, and the cylinder is 44 inches diameter and 50 inch stroke. This mill will roll 4 rail ingots. All the reheating will be done by four Siemens' heating furnaces. The blooming mill will be put in operation in the course of a few months, but the company will continue to make hammered rails for those who prefer them.

In the frog department are manufactured the Billings spring frog and crossing and Lorenz safety switch. Other frogs, switches and crossings are made here, also, but these are the favorites among railroad men. They are made of the best hammered steel rail. About 250 frogs, 120 switches and 15 crossings are turned out per month. This branch of the works is now being enlarged in order to meet the demands upon it. The business of this department has grown rapidly since it has been established in 1872.

The Pennsylvania Steel Company has a capital of $2,000,000. It owns 100 acres of land, on which, in addition to the works they have, it has erected 37 dwelling houses and a store. The works were commenced in 1865, and have been in operation eight years. They have doubled their product within two years, and will turn out about 45,000 tons of finished rails this year. About 100 tons of bituminous coal, 90 of anthracite, and 30 of coke are consumed every 24 hours. The furnaces, rail mills and forge are run day and night, with double and triple sets of hands. About 1500 men are employed.



IMPROVED DRAWING PRESS.

A Threat to Massacre the Chinese in California.

We hope the United States government will take such steps as may be necessary to protect the Chinese residents on the Pacific coast. That they are in need of such protection would seem to be indicated by the following, which we cut from the San Francisco *Commercial Herald*, a conservative journal which is not usually sensational:

This journal has refrained from expressing opinions relative to Chinese immigration, for the simple reason that it is permitted and protected by international treaty, and the subject has been elaborately discussed by the daily press. Nor do we design now to canvass its merits, but merely to raise a note of warning, which we trust will be heeded at Washington. It is undeniable that the nucleus of an organization has been formed in this State for the forcible expulsion of the Chinese, and it is as true that it is composed of material which will be wholly unscrupulous in the method of its accomplishment. Although the entire Chinese immigration into this country for the past 22 years is but a drop in the bucket compared with that which reaches us from Europe every year, yet there is such an immense margin of difference between the two, that no parallel can be instituted. European immigration is acceptable, in fact desirable, while that from China is simply detestible. It should be borne in mind that the originating cause of our late terrible war was not philanthropy for the negro race. It was not only because a certain element of mankind was held in bondage throughout the Southern States, but because the labor and production of those slaves was brought into competition with those of the North. The owner of a certain number of slaves was entitled to a specified number of votes, as composing a Congressional District, and this destroyed political equality. The war disposed of these objections, but Chinese immigration has resurrected the first in California. It is with no little truth that our artisans and laborers complain that the Chinese are depriving them of the opportunity to earn an independent livelihood; but, on the other hand, it is equally true that, but for Chinese cheap labor, we could not profitably manufacture many articles which we now produce. Without stopping to argue these and other points which must naturally suggest themselves to all intelligent people, we beg to assure the Federal Government, in the most solemn manner, that the Chinese of California are sleeping upon a volcano that may burst forth at any time. Public notices have been given through the daily press that the question will be violently disposed of by an Anti-Chinese Vigilance Committee, unless Congress shall take some action to repeal or so modify the Burlingame Treaty, as to suppress Chinese immigration. Furthermore, it is notorious that certain journals in this city and State, while seemingly discouraging any resort to violence, are actually fanning the fires of passion and prejudice, and covertly doing all they can to foment discord, and bring about a sanguinary result. Our Legislature has spoken on the subject in behalf of the people at large, and although its utterances do not represent the views of thousands among their constituents, they undoubtedly do those of the majority, whether it be right or wrong. It cannot be denied that Chinese immigration has been productive of much good as well as of much evil. They are our principal railroad builders, and but for their cheap labor we would have to pay more for freights and fares. But unlike European immigrants, they do not, will not, and never can assimilate with our people; there is a gulf between them, a yawning chasm which can never be bridged. So long as they remain, they will be a source of endless annoyance, and a promoter of outrages which will eventually culminate in terrible bloodshed. Again we take occasion to warn Congress that the nucleus for another massacre that will rival that of St. Bartholomew has been organized here, and that it only lacks leaders of sufficient ability and social standing to give it deadly vitality. This journal cannot stoop to play the role of alarmist, but it is its duty to point out the existence of certain elements which threaten to destroy life and property to an enormous extent. The hurricane once in motion it will be difficult to curb its power, or limit its range.

The Recent Accidents and British Railway Death Rate.

We have previously published Charles Francis Adams, Jr.'s, answer to the old assertion, that American railways are less safe than those of England. Had Mr. Adams' computations and comparisons extended down to February of this year, the comparative showing, the *Railway Review* thinks, would have been much more in favor of American roads. It will be remembered by our readers that the month of January was an exceedingly fatal one on the English lines. Several of these we noted at some length in our editorial columns. During the month of January there were 28 accidents, some of them apparently showing great recklessness. Seventeen persons were killed outright, 18 severely and 75 not dangerously injured, and 125 slightly injured, being cut, bruised and badly shaken. Two railroad directors were among the injured in one of the worst accidents. Nearly all the collisions were due to freight and mineral trains being on the same line as the passenger trains; five trains left the rails, apparently from defects in the track—a species of accident not common on English lines; other casualties followed from trains running into cars left standing on the track, or into trains while in process of switching. This caused the horrible accident on the Great Northern, at Abbot's Ripton, where the Scotch express, running at 50 miles an hour, dashed into a coal train, and was completely wrecked, and within a few minutes another express train, which had failed to observe the signals, came charging into the mangled mass of broken cars and bleeding passengers, at nearly the same speed. We do not mention this fearful record in any spirit of exultation, for we sometimes have terrible railway accidents in this country. It shows, however, that we are not peculiarly reckless in railway management. It is true that American railway managers have and are still paying as much attention to the question of safety as those of any other country. Numerous appliances looking to this end have been adopted, and any invention which is clearly preventive of accident meets a hearty welcome. Much more may and will be accomplished in the use of mechanical devices for securing immunity from accident. But after all has been done in this direction there will still remain the element of carelessness and inefficiency on the part of the human machines, which it will be impossible ever to thoroughly eliminate. We apprehend that railway accidents will never entirely cease. Still they will be, and we believe are even now less in number, proportionally, than those occurring through the use of any other kind of locomotion, walking included.

An Improvement in Puddling Furnaces.—Mr. E. Middleton, of Hernslet Iron Works, Leeds, has made an improvement in puddling furnaces which is well spoken of. The furnace used is similar to that usually employed, except that between the puddling chamber and the fire-grate he fixes a melting chamber, wherein the pig metal is brought into a molten state. The heat first enters the melting chamber, and converts the pig into a fluid state, which is then run into the puddling chamber by means of a channel or spout. While the molten iron is being worked the melting chamber is again charged with pig, which, when melted, passes into the puddling chamber as before, and so on in succession, thereby keeping the puddling and heating chambers continuously at work. After the fire is first fed the process consumes the whole of the smoke, and the heat generated in the melting chamber and that which in the old process escaped up the chimney is utilized in the puddling chamber.

Hardening Tools.—Mr. W. Oldfield, in a communication to the *English Mechanic*, says: "Mercury is the best liquid for hardening steel-cutting tools. The best steel, when forged into shape and hardened in mercury, will cut almost anything. I have seen articles made from ordinary steel, which have been hardened and tempered to a deep straw color, turned with comparative ease with cutting tools, from good tool steel hardened in mercury."

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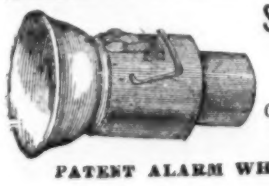

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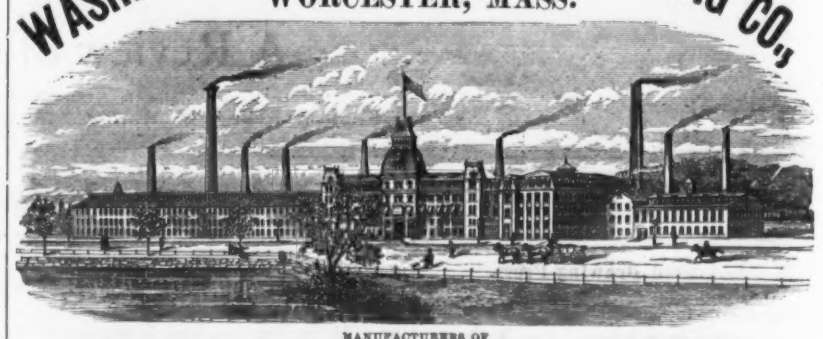

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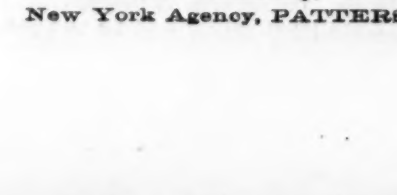

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Of all sizes straightened and cut to order.

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Sun Burners, Brass Tubing, Brass and Copper Wire, Copper Bottoms, Iron and Tinned Rivets, Brass and Japanned Oilers, Tin Tobacco Boxes, Farmers' Lanterns,

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The above cut represents our new **Marcy Lantern,** so that its advantages over others in market can readily be seen. With a tempered steel elliptic spring operating directly on the top, it can readily be adjusted and is firmly locked in its place. No sudden pressure on the guards or frame will displace the Globe; the Frame, Bail and Lock being all connected, there are no small parts to get lost or worn out. Arrangements complete for burning Kerosene, Candle and Oil.

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Tinned Wire, Tinned, Broom, Spring Wire, made from Bessemer Steel; Cast Steel and Iron Coppered Ball Wire; Rivet, Screw, Buckle, Umbrella, Fence Brush, Gun Screw Wire; Sewing Machine and Machinery Wire. Fine Wire for weaving. Also Wire of any shape made to order.

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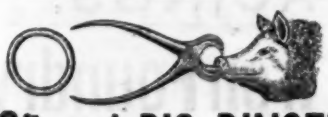

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MAKES TWO SIZED RINGS. Satisfaction guaranteed. Send for prices.

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PATENT PRUNING SHEARS.

No. 1 Swivel Blade, No. 2 Stationary Blade, manufactured by

TRENTON VISE AND TOOL WORKS,

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Solid Box Vises, Hammers, Sledges, Picks, Mattocks, Grub Hoes, etc.

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Our Vises are warranted to do more work than any other make. No broken boxes or screws.

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Universally acknowledged to be superior to all others. We call special attention to its price and merits. Has Self-Adjusting Steel Elliptic Springs, and is always ready for a collar or a bed-spread, and both are wrung equally dry. The **"friction"** principle upon which it is constructed has been proven the best in use. Taking into consideration the quality of all material used, the extra price paid for the rolls, and the thoroughness of its manufacture, the Eureka costs more money to make than any other wringer; and yet we sell it at $12·00 a dozen less than inferior machines. Make a note of this when you buy your next stock.

No. 2, Regular Family Size, 10 in. Rolls, $60·00 per dozen.

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Proprietors of the
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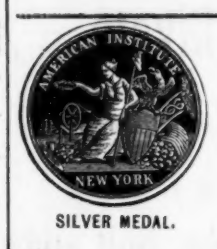

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Cherry Heat Welding Compound.

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This compound is put up and warranted genuine only in 1, 5, 10, 50 and 100 lb. packages, and can be obtained from the manufacturers direct, or from the following General Agents at manufacturers' prices, in large or small quantities:

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It is also for sale in 1, 5 and 10 lb. packages by Hardware Dealers generally throughout the country.

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Bird Cages.

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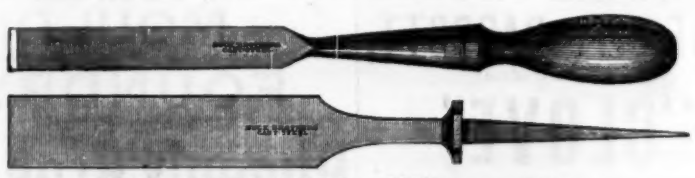

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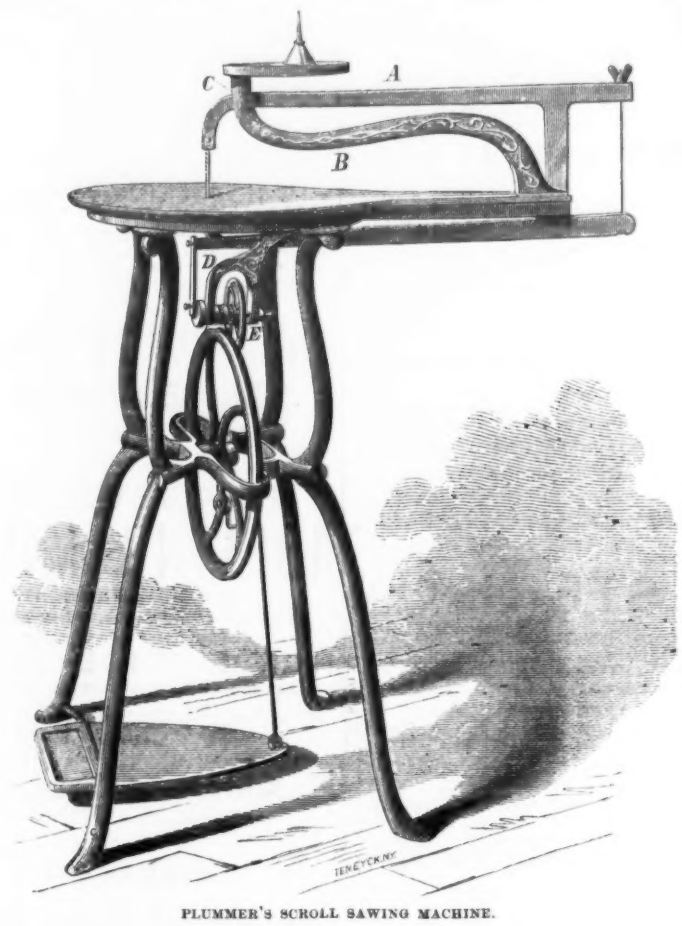
The most complete assortment in the U. S. of **Shank, Socket Firmer, and Socket Framing Chisels,**

PLANE IRONS.

Gouges of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

Plummer's Scroll Sawing Machine.

In the annexed engraving we illustrate one of the small and inexpensive tools for amateurs, which are becoming so popular. The machine is a foot-power scroll-saw. The table is provided with a horizontal rear extension, to which the reciprocating saw frame, A, is pivoted. The arrangement of the frame will be readily understood from the illustration. The connecting screw rod, at its rear end, serves to draw the front extremities of the arms apart, thus tightening the saw clamped therein. To the rear of the extension, a curved arm, B, is attached, which carries a plate conveniently located for holding the oil can and necessary tools. Arm B, has a slotted recess at C, which serves as a guide for the upper bar of the saw frame. A band spring may be interposed between said bar and the arm, to assist the upward motion of the frame and prevent the contact thereof with the upper part of the recess. Beneath the table is a short arm, D, and a slot therein guides in similar manner the lower bar of the frame. This arm is extended downward and is forked to hold the shaft, E, of the gear, which receives motion from the wheel and treadle shown. A small fly-wheel on shaft, E, assists the rotation of the same, and the crank disk and rod on the front end form the connection with the saw frame, and impart reciprocating motion to the same. The arrangement of the legs with the table is obvious from the illustration, and forms a rigid and substantial support. The machine is adapted for fret sawing, and for the cutting out of brackets and similar ornamental wooden articles. Mr. Jerome H. Plummer, 1276 Pacific street, Brooklyn, N. Y., is the inventor.



PLUMMER'S SCROLL SAWING MACHINE.

The Electro-Harmonic Telegraph.

For some weeks past there has been on exhibition in Philadelphia, at the dental salesrooms of Dr. S. S. White, corner Twelfth and Chestnut streets, a very novel and interesting apparatus, called the electro-harmonic telegraph.

The audience having assembled at one end of the room, which was about 200 feet long, the inventor of the system, Mr. Elisha Gray, of Chicago, explained briefly the operation of the various sections of the apparatus. He told the audience that as a novelty, and as a partial exhibition of the principles involved in his telegraphic apparatus, he proposed first to reproduce tunes that were being played at the other end of the room, by merely attaching a wire leading from the apparatus to the instrument that was being played. He then exhibited a small box, made of thin material, with a series of holes bored in it for acoustic effect. Upon this box was mounted an ordinary electro magnet, with a soft iron keeper rigidly fastened to its poles.

He explained that when a bar of soft iron, such as is used in an ordinary electro-magnet, was charged magnetically by passing an electric current spirally around it, the bar was elongated, and that when the charges ceased, it returned suddenly to its normal length; that, in returning, a noise was produced which was amplified by the box upon which it was mounted, the box acting as a sounding board; that according to well known laws of acoustics this noise could be converted into a musical tone by repeating it uniformly at a definite rate per second; the pitch of the tone being determined by the rate. He then described the apparatus by which the tunes were transmitted as composed of a series of steel bars, each tuned to correspond to its position in the musical scale, each bar having a corresponding key, and the keys arranged as in an ordinary musical instrument; that when any key was depressed, its corresponding tuned bar was thrown in vibration by a local battery, and at the same time it interrupted the main line battery a number of times per second, corresponding to its own fundamental; that these interruptions or impulses passed through the line, throwing all the cores of the magnets in circuit in sympathetic vibration with the transmitting bar. The wire was then attached to the magnet mounted on the box, when it immediately began to sing. A number of airs were played, which, to the uninitiated, would seem to be the work of an invisible agency from "the other side."

Mr. Gray then disconnected the wire from the box and connected one pole to a revolving metal disc, and, taking the other pole in his hand, completed the circuit by placing his finger upon the disc. As soon as the metal disc was revolved, the tune that was being played at the other end of the line was plainly heard issuing from the metal plate. The explanation of this curious phenomenon we leave for a more scientific article.

The next step was still more wonderful, as well as more useful. Heretofore the operator had only been sending simple tones, varying in pitch to suit the melody. Now the wires were attached to a series of eight tuned boxes, differing in pitch, and each having its complement in a transmitting bar tuned in unison with it. When the eight transmitters were simultaneously sounded eight tones were simultaneously sent through the wire, each tone being picked up and sounded by the box in unison with it—in other words, tone number one sounds in box number one and is rejected by the other seven; tone number two sounds in box number two and is rejected by the other seven, and so on through the series. When all the tones were sounding together, each box sounded only one, and that one differed in pitch from all the others. If the transmitting key of any particular tone were opened, the box corresponding at the receiving end immediately ceased to sound without in any way interfering with the other boxes. If the key were then manipulated by a Morse operator in the ordinary way, a message could be received at that particular box but at no other. If a second key is at the same time manipulated, a second message may be sent and received on its corresponding receiver at the same time, and so on through the whole series, giving one wire the capacity of eight ordinary Morse wires with the present apparatus. There is no reason why this number should not be doubled or tripled as the tones of the different octaves can be utilized. The system was explained by the inventor and put into practical operation, messages being sent and received.

The apparatus is very simple—simpler even than the present Morse apparatus in general use. It is not difficult to see at a glance that a system that does so much with one wire, and with such simple and inexpensive apparatus, is very valuable, and must, sooner or later, go into general use.

This system is applicable to all the local purposes for which the telegraph is used, such as private lines, fire and district telegraphs, &c., &c.

The inventor claims for his system economy in battery force, in wire, in general expenses, and in some of its applications great reduction in operating force.

Another great advantage it possesses is the opportunities it affords for introducing a system of secrecy or privacy upon a wire simultaneously used by a number of different parties. Messages sent, for instance, over a wire, in one tone, would only be intelligible to an operator at the other end who possessed the corresponding key, and knowledge of the nature of dispatches could be confined to as small a number of persons as is desirable.

Practically, this system has been thoroughly tested for weeks together, under the most unfavorable atmospheric conditions, and its complete success has been repeatedly demonstrated. —*Railway World.*

The Jern-Kontoret, of Sweden, has lately presented Lafayette College, Easton, Pa., with a complete set of iron, copper, nickel and lead ores, together with a full suit of the irons, steels, slags, mattes and metals made from them. The department of mining engineering, of the same college, has received the gift of a large collection made by P. W. Sheafer, of Pottsville.

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Successors to GAM'L G. SMITH & CO.,
IRON WAREHOUSE,
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PIG IRON, OLD RAILS,
Wrought Iron Beams. Iron of all sizes and shapes made to order.

Manchester Steel Works,
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sell from stock, at lowest prices, all descriptions
Best Tool & Machinery Cast Steels
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Cast Spring, Sleigh Shoe, Toe Calk nd Plow Steel. Best Cast Steel and Bessemer Wire Rods.
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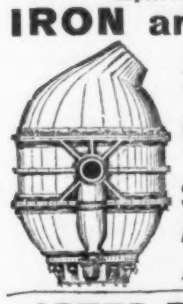
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MACHINERY STEEL,
Cast Steel and
SPRING STEEL,
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Special Irons for Bridge and Architectural Work.

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12, 14 & 16 Worth Sts.,
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Manufacturing Iron
Used in the Construction of
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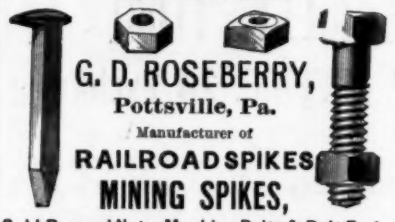
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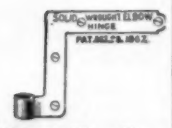

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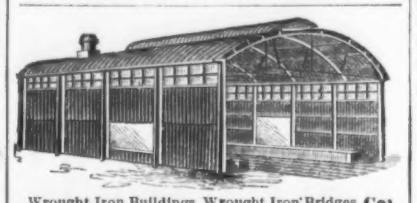

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New Patents.

We take from the records of the Patent Office of Washington the following specifications of certain patents, lately issued, which will be found interesting:

IMPROVEMENT IN DOOR FRAMES AND JAMB PLATES FOR FURNACES.

Specification forming part of Letters Patent No. 173,028, dated February 1, 1876, issued to James C. Longland, of Rome, New York.

Hitherto door frames and jamb plates for furnaces have been made of cast iron, the door frames having a small pipe cast into them, for the passage of water for cooling purposes; but the intense heat of the furnaces acting on the inside of the door frame, and the outer side being kept much cooler by the action of the water, causes an irregular expansion of the cast iron, and, consequently, breakage, after which the water must be stopped, and the door frame soon burns out and must be replaced with a new one. This breakage and burning out often occur within a week, and the cast iron door frame seldom lasts more than six weeks or two months; hence the necessity for improvement in the material used.

Fig. 1.

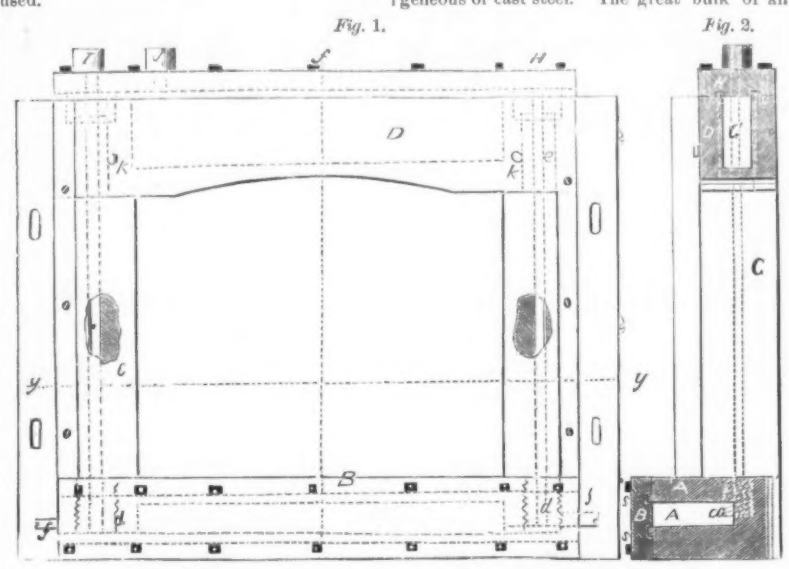


Fig. 2.

IMPROVED DOOR FRAME AND JAMB PLATE FOR FURNACES.

Jamb plates are usually made of cast iron, and cooled by the action of blast supplied by a blower. Plates thus constructed and cooled are of short duration, and when once burnt out are a cause of great expense, as the brick jamb of the furnace is supported by the jamb plate, and when once the jamb plate is destroyed the brick jamb loses its foundation and falls into the furnace, causing a great outlay of time and material, which, by a wrought iron jamb, will be saved.

Figure 1 is a front elevation of improved door frame. Fig. 2 is a sectional elevation on line *x x* of Fig. 1.

A is the bottom plate of wrought iron, being forged into one solid piece, having a chamber, A', cut out from the outer or front edge for water passage. B shows the front plate or cover to said water passage, secured to the plate A by screw bolts, and being tongued and grooved to make water-tight joints, as described in Patent No. 161,135, for water boshes. C C show the side posts or door jambs, which are made of one solid piece of wrought iron, through which a hole, C', is drilled lengthwise, and which are connected with and fastened to the plate A by a screw thread, *d*, cut upon the end thereof, closely fitting a corresponding thread cut into said plate A, to make water-tight joints. The lower and upper ends are to be, in practice, jointed by groove and tongue for packing. The upper ends of posts have close fitting tenons *e*, without screws, which enter sockets formed in top plate D. D shows the top plate, also of solid wrought iron, into which is cut a chamber or water reservoir, G, which is connected with one of the posts by a passage, thereby causing a constant circulation of water. H is the cover of reservoir, which is secured to the plate D by screw bolts, and tongues and grooves formed on the inner edge of the reservoir, so as not to be cut by the bolts. Through this cover passes the inlet pipe J, and the outlet pipe I. K K represent keys, which pass in at one side of plate D, into seats in the posts C C, thence into the opposite side of plate D, thereby securely joining plate D to posts C C. Guards are furnished to keep the door of the furnace in its place. By means of outside flanges the door frame is fastened to furnace. *f* represents screw plugs, stopping holes through which the water is drawn to clean out; also to prevent freezing, when furnace is not working in cold weather. The jamb plate is also made of solid wrought iron, and is cut out from the bottom up to make a water chamber, and made to be water-tight, with a bottom plate by means of tongues and grooves, same as the plates A and D of door frame.

The ends of jamb plate are beveled, so as to make them fit, the one to the side of furnace and door frame, and the other to the water bridge bosh, thereby forming a complete water circulation all around the furnace.

The passage of the water is as follows: Entering in at the pipe J into the reservoir G, it goes down the right-hand post C into and through the plate A, up the other post C, going through the sockets, and discharging through the outlet pipe I; thence into the bridge bosh, forming a complete circulation of the furnace, and finally discharging itself into the tool bosh, for the purpose of cooling puddlers' tools.

Claim.—1. The combination of hollow plate A, front B, screw and tenon posts C C, having hole C', and the covered plate D, having the passage F.

2. The top and bottom plates having water chambers G A, inclosed water-tight by cap plates, tongued, grooved and packed and bolted on.

IMPROVEMENT IN THE MANUFACTURE OF STEEL.

Specification forming part of Letters Patent No. 171,183, dated Dec. 14, 1875, issued to Frederick J. Slade, of Trenton, N. J.:

Ordinary crude irons, it is well-known, are heterogeneous compounds of iron and a comparatively small quantity of numerous other substances; but of all the substances usually found in admixture with iron, and which it has been heretofore one of the purposes of refining and steel making to eliminate, phosphorus has been regarded by manufacturers of cast steel as the most pernicious for the purposes of their art, not merely because its effect upon the quality of the steel has been injurious, but also, and chiefly, because of the great tenacity with which it unites with the iron to resist all processes and agents for their separation, which have not been found too inconvenient or costly for ordinary use in steel furnaces. Heretofore, all irons containing a larger average proportion of phosphorus than from fifteen to twenty hundreths of one per cent. of their weight have been deemed unfit for manufacture into homogeneous or cast steel. The great bulk of all the iron produced contains a larger proportion than this of phosphorus; consequently, the iron suitable for steel making is comparatively scarce and dear.

Finding that he could not practically separate the phosphorus from the iron, the inventor sought to render its presence useful, and discovered that this could be done by expelling, as far as conveniently practicable, all the other substances, so as to leave the phosphorus in preponderance over any of them, while it unites with the iron to form an alloy or combination which is homogeneous, fusible, malleable, and well adapted to such uses in the arts as require a material having these properties, and which is stronger and more homogeneous than wrought iron.

The new method of manufacture, therefore, utilizes phosphorus in making cast steel in such a manner that cheap phosphoric irons may be employed for conversion into such steel, instead of the most costly irons, containing little phosphorus, heretofore deemed indispensable for that purpose.

This steel may be made conveniently and economically by the Martin process, in a Siemens reverberatory regenerative gas furnace, in the open hearth of which is charged the quantity and proportions of crude materials which are usual in the practice of making carbon steel by means of that process and furnace; such charge consisting of pig iron, old steel rails, or other steel scrap and wrought iron, old iron rails, iron sponge, or scrap iron or iron ore, or any part of these materials, or of cast or wrought iron or steel, in any convenient form and proportions. The phosphorus combined in the materials of the charge may be in the proportion of twenty hundredths to fifty hundredths of one per cent. of the weight of the iron, according to the wastage in the process, and the degrees of fusibility, malleability and ductility required in the finished product.

Practically, the separation of any excess of phosphorus from the charge in the furnace is too difficult to be undertaken; therefore, the aim of the furnace man must be in all cases to have a slight deficiency of phosphorus in the charge, and to compensate that deficiency by means of carbon, to be left in or added to the charge, as may be convenient, since any excess of carbon can easily be removed at any stage of the process by means of oxidizing or decarbonizing agents. If in any case it should be expedient for any reason, technical or economical, to use silicon, chromium, titanium, or other steel-ifying agent in place of carbon, to compensate the deficiency of phosphorus, then the proper equivalent quantity of the replacing agent selected must be left in or added to the charge. If, however, through inadvertance or otherwise, the phosphorus should be found to be in excess, and the steel too hard, then iron containing less phosphorus must be added to the molten mass until the average proportion of phosphorus shall be sufficiently reduced to make the steel of the softness or temper required. Small quantities of the steel are from time to time withdrawn from the bath and tested, by casting, forging, bending, or otherwise, in order to determine the condition of the charge, and show if anything further, and if so, what, is needed to finish it.

After the materials have been melted together, and the proper proportion of each duly established by testing, a quantity of manganese is then to be added, preferably in the form of ferro-manganese or spiegeleisen. From two to ten per cent. of the weight of the charge of the average spiegeleisen of commerce, or its equivalent of ferro-manganese, will supply the manganese required, the precise quantity needed in each case being determined by the workman in charge of the furnace, by testing specimens or otherwise, as in the ordinary manufacture of carbon steel by the Martin process.

A maximum of phosphorus can be obtained in the steel only when it contains a minimum of carbon; therefore, in order to use the most phosphoric irons which the process admits, it was sought, by means of the chemical reactions in the furnace, to eliminate the carbon to the utmost from the charge, but found a practical necessity for leaving a small residue, because, when carbon is reduced to a high degree of attenuation, the reaction of oxidizing agents upon the iron grows so intense and wastes it so rapidly that it becomes expedient at this point to arrest the elimination of the carbon. The steel thus made is soft, malleable and ductile, but not very fusible when the proportion of phosphorus combined in it is small; but as the proportion of phosphorus is increased the steel is rendered more fusible, and less malleable and ductile.

Claim.—The process of forming steel by regulating, in an alloy of iron, manganese and phosphorus, the quantity of carbon, silicon, chromium or titanium to supplement the steel-ifying action of the phosphorus already in the steel to the desired extent.

IMPROVEMENT IN TEMPERING AND FORMING ARTICLES OF STEEL.

Specification forming part of Letters Patent No. 169,736, dated Nov. 9, 1875, issued to Geo. F. Simonds, of Fitchburg, Mass.

The drawing is a vertical cross-section. This invention relates to the hardening, tempering and bringing to their ultimate forms articles of steel, or of steel and iron combined, and is an improvement on Patent No. 151,167, dated May 19, 1874; and it consists in the process and in several combinations of devices, hereinafter explained and claimed, whereby saws may be tempered and straightened without the usual process of hammering.

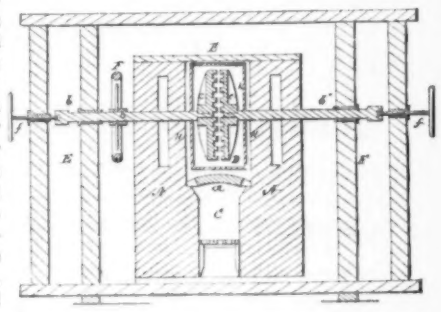
In the drawing, A A represent the walls of an oven, B the roof, C the fire box and D the tempering and forming chamber. Above the fire box is placed the fire-proof tile *a*, to distribute the heat in its passage to the tempering and forming chamber. This chamber is air-tight and of any suitable material—preferably boiler iron—with hot air chambers H on each side and above it. The door L, which closes the tempering chamber, is lined with asbestus or other non-conducting material, to prevent the escape of heat by radiation; but this is not essential. The formers *c c* are suspended in the tempering chamber by means of the revolving shafts *b b'*, provided with necessary bearings in frame work E E. The outer ends of these shafts are provided with screws *f f*, by which they can be moved longitudinally and the formers can be closed or opened within the tempering chamber. By means of the wheel F the shaft *b* may be readily revolved, and when the formers are brought in contact or closed on an article to be tempered it is evident that the shaft *b'* will also be caused to revolve with the shaft *b*, and the two formers may be revolved within the chamber D. This revolution of the formers may become desirable in order to secure more certainly a uniform temperature.

The great purpose of this construction is to place the article to be tempered and formed entirely out of the reach of any draft, and thus secure an evenness of heat essential to success. The heat in the surrounding chambers H may be readily regulated or directed from one portion of the chamber D to another by means of small vents through the top of the furnace.

When the saw or article to be tempered and brought to its ultimate form has been properly hardened it is placed between the formers *c c*, the door is closed, and the article is secured in position by the gradual movement of the screws *f f* until the pressure is sufficient to bring the piece to the desired form, where it is held subjected to the perfectly uniform and desired amount of heat until the article takes a permanent set to the required form, when it can be removed to make place for another.

Formers *c c* are of a novel construction. The face of the former, instead of being a smooth flat surface, is grooved in such a manner as to divide it up into numerous small surfaces resembling somewhat the face of a waffle iron. Behind this face is a series of radial ribs, *k*, to strengthen and support the same.

It is desirable to make the former double by interposing between the face plate and the backing an open space, so as to admit the heat freely over the rear of the face plate, which, being of uniform thickness, is thus more certainly heated to a uniform temperature.



IMPROVED TEMPERING AND FORMING APPARATUS.

It is evident from the description herein given of the apparatus for tempering and straightening saws that, by using a long horizontal tempering and forming chamber, band saws of any length or size may be successfully made.

Instead of the formers used for pressing the ordinary circular saws, band saws may be stretched while being subjected to the heat in the tempering and forming chamber with perfect success.

The leading object of the invention is to produce a perfect saw without the necessity of hammering; and the inventor, after a long series of experiments, that, in order to readily straighten the saws and leave them sufficiently hard, it is necessary to use a more highly carbonized steel than is or can be successfully worked by the present mode of straightening by hammering, by which means, in connection with the improved oven and devices, we not only secure the desired object, but produce an article very much superior in many respects to those made by the old method.

Claim.—1. Formers *c c*, constructed with a cross grooved face.

2. The combination of formers for holding articles to any required position with an air-tight oven, D.

3. The combination of formers for holding articles to any required position with an air-tight oven, D, inclosed in a heating furnace.

4. The combination of formers *c c* and revolving shafts *b b'* with oven D inclosed in heating furnace.

5. The combination of formers *c c*, revolving shafts *b b'*, and screws *f f* with oven D, inclosed in heating furnace.

6. In combination with a tempering oven, revolving vertical formers.

7. The improved process, herein described, of tempering and straightening saws by means of heat and pressure, and without hammering, the saw being protected from atmospheric currents.

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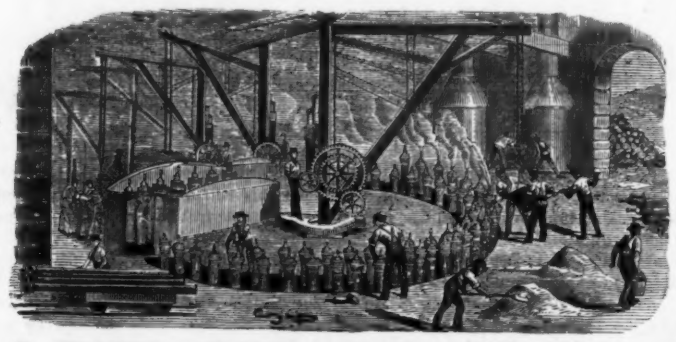

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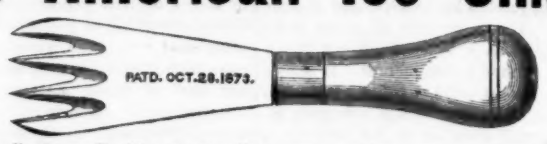

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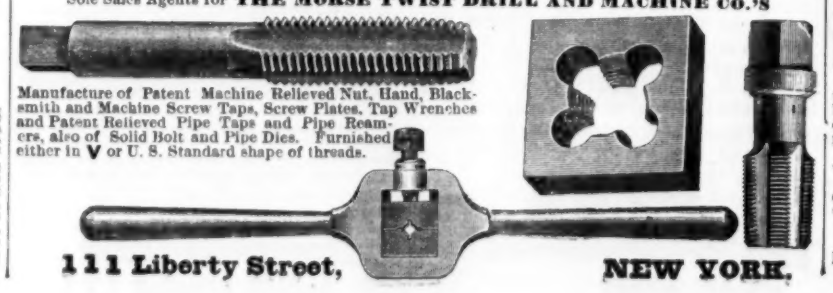

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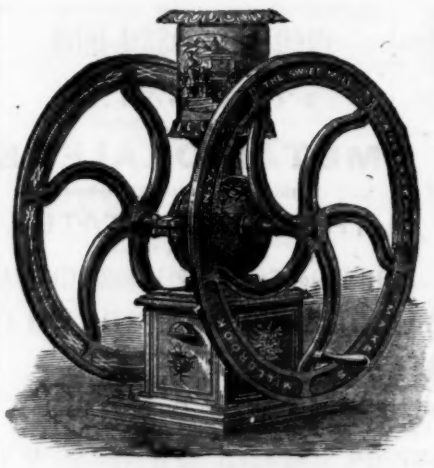

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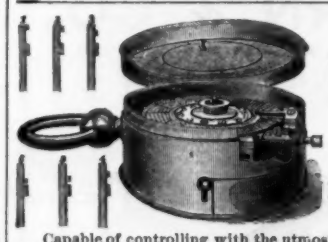

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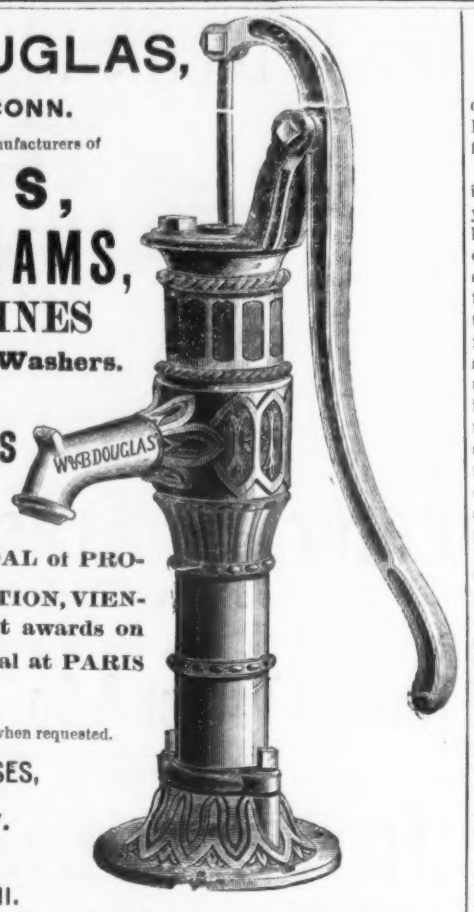

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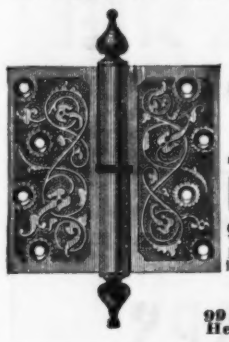

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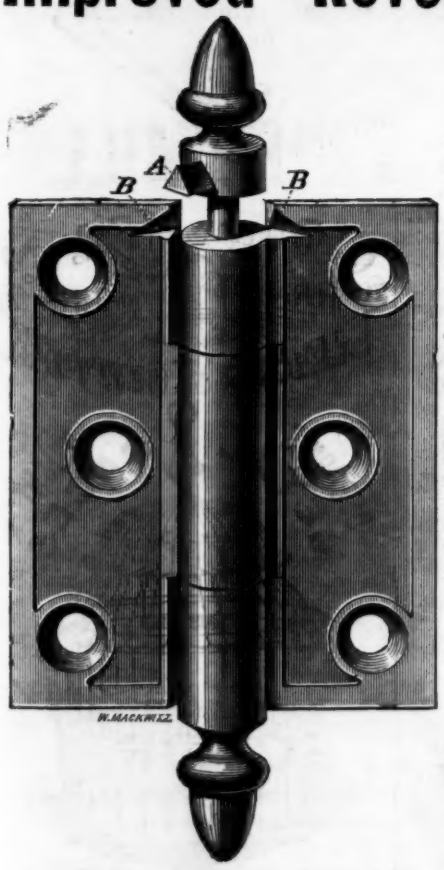

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The Form of the Blast Furnace.

A writer in *Iron*, in discussing some recent developments in the technology of iron, says of British experiences as to the best form for blast furnace:

The question of the best form for the interior of the blast furnace has not of late years occupied so prominent a place in metallurgical discussions as it deserves. The eager debates on the relative advantages of hot and superheated blast and monster and medium furnaces have, so far, exhausted these topics, till fresh material for argument has been furnished by further experience. The contour and construction of the furnace is, however, a matter of almost equal importance as affecting the economy of manufacture, while the remarkable variation in practice on this point shows the need of doing something toward reconciling practice with theory. At the present time not only does almost every country affect a form of furnace differing in essential particulars from that approved by its neighbors, but in the same district furnaces working on the same materials frequently present widely different types. It is true that an absolute uniformity of practice is manifestly impossible of attainment, as the "lines" best suited to a particular ore and fuel would be quite inapplicable under other conditions, but, nevertheless, certain guiding principles are of general application. Cylindrical, barrel shaped, conical, parabolic and elliptical furnaces—furnaces with high angles, furnaces with low angles, furnaces with no angles—cannot all be alike correct in principle, nor equally advantageous in practice.

The foundation of all improvements in furnace construction was unquestionably laid by Mr. Gibbons, who had the shrewdness to decipher the lesson "which a fiery finger had written on the walls of his furnaces." In other words, he perceived that, by adopting in the first instance the contour which experience showed would ultimately be shaped out by the action of the heated materials, whatever the original form, he should obtain at once those economical results which old furnaces generally give, but which otherwise would only be obtained after many years or months of uneconomical working. And it is excellent testimony to the cuteness of this keen observer and quaint commentator, that the interpretation which he placed on the phenomena he recorded has hardly been modified in any material particular, while the best advice that could be given to furnace designers would be to study their art in the same school.

There are, however, certain preliminary considerations which should guide us in designing the best construction for a furnace, and which assist in rightly applying the information given by the eroded sections of an old furnace. Thus, the dimensions of the hearth should bear such a relation to those of the stack that smelting and reduction may proceed *pari passu*, allowance being made for the possible need of a special allowance for carburization. Then the curves or angles should be such as to offer the least possible frictional resistance to the descent of the charge—if scaffoldings and slips and their attendant evils are to be avoided. Nor should the boshes be so wide as to allow any part of the charge to lie out of the direct current of the gases. Very important is it that the gases should ascend in a regular column, spreading equally through the whole section of the stack, and not escape more rapidly at the sides than at the center, as they very often do. Some metallurgists insist that the mixture of the elements of the charge should be promoted by the inclination of the furnace walls, while others regard the descent of the charge in parallel horizontal layers as of equal importance. The influence of the width of the furnace mouth is to be carefully considered as affecting the distribution of the charge, the escape of the gases and the reverberation of heat downward. The mode of charging and taking off the gases, the proper thickness and best way of preserving the wall, and the most convenient mode of tapping slag and metal, are outlying branches of the subject which are well deserving of attention.

When Mr. Gibbons commenced his investigations, some forty years ago, the angle of the boshes in Staffordshire, as on the Continent, was usually laid at so small an inclination that the greatest obstruction was thereby offered to the descent of the materials into the hearth. The hearth itself was generally so narrow (2 or 3 feet square) that fusion could only proceed very slowly. The result was that a column of reduced ore would be retained in the stack long after the gases had ceased to have any further effect on it, simply because its progress toward the crucible was impeded by friction and the inadequacy of the hearth space. It was, therefore, inevitable that there should be an enormous waste of fuel. Now, after some six month's or a year's working, it was found that the boshes and hearth were worn away to a very great extent, so that the hearth had assumed a circular form, and the angle between the boshes and the hearth was nearly obliterated, and it was only after this that the furnace began to do its best work. The enlargement of the hearth, even to the limited extent of an increase from 3 to 4 feet in diameter and increasing the elevation, and, therefore, the slope of the boshes was followed by the best results. At the present time hearths of 7 and 8 feet diameter are common, while in some instances, as at Ormesby, 10 feet has been reached. In Scotland, also, as a rule, wide hearths prevail. The circular form, which the fire in any case cuts out for itself, has also been almost universally adopted. The question then arises, Can hearths be too wide; or, at least, have we reached in practice the greatest profitable dimensions? Mr. Forbes is of opinion that an increase in the capacity of the hearth would, in many cases, at least, be beneficial. Continental practice, however, does not favor wide hearths, and Gruner believes that Cleveland has gone too far in this direction. This metallurgist advocates the use of high and narrow hearths; and would extend his objection to broad hearths to those of copper and lead smelting blast furnaces, in which Mr. Forbes found wide hearths were particularly beneficial. Now, there can be no doubt that, with ordinary furnaces, a very wide hearth will sometimes cause trouble; as, if a slip of unfused material take place into the hearth, it is hard to get rid of it by concentrating the blast upon it. So, with very infusible ores, the concentrated heat of a narrow hearth, which also keeps the charge longer in the fusion zone above the hearth, may be very useful, unless we have a superheated blast at command. In charcoal furnaces, also, the limit beyond which it is inexpedient to widen the hearth is soon reached. But most of the alleged difficulties with wide hearths are due to insufficient and ill-distributed blast power. With plenty of blast—not necessarily at a great pressure—and a sufficient number of tuyeres, a wide hearth need give no trouble, while it renders it more easy to give the boshes their proper inclination. Even with refractory ores, by using a sufficiently heated blast, it is easy to keep the temperature as high as is necessary; it is, however, for fusible mixtures that ample fusion space is most useful. For coal burning furnaces, as Wedding has pointed out, a wide hearth is always desirable; hence their adoption in Scotland. The same may be said when dealing with silicious ores and hot blast, if the quality of the pig is to be preserved. In the yearly increasing industry of spiegel making, in which a high temperature is very important, the advantages of a large hearth capacity are generally admitted. It need hardly be said that the question of the proper dimensions of the hearth must, after all, always be mainly decided by the special circumstances of each furnace, such as the quality of ore and fuel available, the quality of pig it is desired to produce, and the temperature and volume of blast available. Yet, subject to these restrictions, there are not wanting indications that an increase of hearth area might, in many cases, be advantageously introduced, especially if, by the use of an increased number of tuyeres, the foci of vigorous combustion which surround each tuyere are regularly distributed over the whole space, and when fusible mixtures are operated on.

We have seen that one of the effects of the shaping action of fire and friction on the interior of a furnace, as observed by Gibbons, is to plane away and round off, to a great extent, the sharp angles between the hearth and the body of the furnace. A good example of this action is shown in a section of the interior of an Austrian charcoal furnace at Mariasgell after a campaign of several years. This furnace was giving, at the time it was blown out, results superior to any it had before attained; and we find that it then had almost obliterated the bosh and hearth angles, and assumed a shape not unlike the continuous curve of certain Belgian and modern Staffordshire stacks. Weniger goes so far as to say that the consumption of fuel with very flat bosh-angles will be nearly double that which would be necessary with the most favorable inclination. Parry says an angle of 70° is the most advantageous, while on the Continent an inclination of only 40° is not uncommon. It is believed that the difficulties and unsatisfactory results which were recently encountered with certain of the monster furnaces in Cleveland were mainly due to a want of attention to this particular. The very considerable pressure exerted by the lofty columns of materials in a modern stack renders it particularly desirable to confine its thrust as far as possible to a lateral direction.

If the course of a mixed charge of fuel, flux and ore is followed from the throat of the furnace downward, it will be seen that till it approaches the zone of incipient fusion its bulk will not be materially altered, except by the compressive action of the superincumbent mass and the gradual removal of a portion of the fuel as carbonic oxide. This will be most conspicuously the case when the ore has been calcined, and the fuel coked, prior to its introduction. The right form for the shaft of the structure would seem therefore to be a section very gradually diminishing from the throat to the boshes, and thence rapidly contracting to the crucible. But we find that many furnaces expand from the top to the boshes, the enlargement being in some cases, especially in charcoal furnaces, very marked. In other cases we find cylindrical stacks; this pattern, or a near approach to it, having found much favor in Scotland and elsewhere since its introduction fifty years ago.

It is generally assumed that the expansion of the furnace downward is of advantage in diminishing the resistance to the descent of the materials. But both the fact and the advantage are exaggerated. The downward pressure of the column of materials is, if not greater, at least more regular in the cylindrical stack, and this is of great effect in preventing the formation of obstructions and promoting a regular descent. Moreover, a rapid descent through the stack implies a prolonged sojourn in the highly heated space about the boshes; for it is found that the total time occupied by a charge in passing through a conical furnace is not less than that occupied in other forms of furnace. Now we have seen that it is in the comparatively cool region of the stack that reduction takes place most economically; and it is also to be observed that it is in the lower region of the furnace that the metal takes up those bodies—such as phosphorus, sulphur and silicon—which are most deleterious to its quality. Any time, therefore, which the metal spends in the region immediately above the hearth, beyond the period absolutely necessary for carburation and preparatory fusion, is distinctly prejudicial; while the longer time it spends in the relatively cool regions of the stack, where $CO_2 + C = {}_2CO$ reaction is minimized, the more economical will be the result. It may be inferred, also, that in the tall furnaces now in use, carburation commences much sooner than in the old form, and that therefore the only justification for the narrow stack and wide boshes—namely, the expediency of producing a highly carburized pig—is removed. Any considerable widening from the top downward has also a tendency to promote accumulation of materials at the angle formed by the junction of the boshes and shaft, and hinders an equably diffused up flow of the gases. But so great and, indeed, well founded is the apprehension of irregularities and scaffoldings entertained by iron masters, that any alteration of a mode of construction which has the reputation of preventing their occurrence would be only very cautiously adopted. Yet we are not aware that either the so-called cylindrical furnaces, or those Staffordshire furnaces, which, like Gibbons' improved pattern, begin to taper downward from a point more than half way up the furnace, are particularly subject to this drawback.

The enlargement of the upper part of the furnace "by scooping it outward," which Gibbons considered of the highest importance, has been advocated with great ability and particularity by Mr. Parry, of Ebbw Vale, and, at his instance, many South Welsh furnaces have adopted the dome shaped stack which he recommends. Though it is doubtful whether so little action takes place in the upper part of the furnace as Gibbons imagined, it is probable that, with low furnaces and friable fuel, and such ores as those of Staffordshire and South Wales, the dome shape has certain advantages which justify its adoption. A great capacity for a given hight, and the accumulation of heat in the stack, are, perhaps, its most obvious features. According to Parry's formula, the depth from the widest part to the tuyeres should be not less than the diameter at the widest part *plus* half the diameter at the tuyere level. He also gives minute directions for the proper curve to be adopted from the top of the boshes to the mouth.

In the Rachette Furnace, which expands continuously from the hearth to the top, there is presented the most extreme contrast to the conventional type. This mode of construction presents, theoretically, certain decided advantages—the extreme division and regular distribution of the blast, among others—yet, notwithstanding the favorable accounts of its work given some years ago, it appears to have quietly dropped into the ranks of exploded ideas as regards its application in the metallurgy of iron. It remains to be seen, however, whether a modification of the principle may not still do good service; and it is worthy of remark that in Germany, and notably in the United States, the Rachette principle, both in its integrity and as modified by Piltz, works admirably in lead smelting. Truran, of Dowlais, proposed a mode of construction similar to that adopted by Rachette many years ago, and pointed out that a progressive increase in diameter, from the hearth upward, would secure a more uniform descent of the charges, and, as we shall show later, both by presenting a minimum resistance to the passage of the blast, and otherwise facilitate the operations of the furnace. It would, however, be in remote districts, where high furnaces and powerful blast apparatus are so costly as to be practically inapplicable, that this type of construction would have the most success.

An elliptical section, the application of which to blast furnaces was patented by Algers 20 years ago, presents, in common with Rachette's oblong section, the advantage of allowing the charges to sink uniformly through the stack, and, as Dr. Percy has pointed out, renders it comparatively easy for the blast to reach the center of the furnace, however large its dimensions. A small elliptical charcoal furnace in Massachusetts, 33 feet high, appears, according to recent accounts, to give very good results, considering its small size. On the other hand, a circular shape offers less external area for a given capacity than any other shape. That this is important, as affecting both economy of construction and loss of heat by radiation, is obvious. As the introduction of elliptical furnaces was inaugurated with anticipations of the most glowing kind not altogether unsupported by scientific metallurgists, it would be of interest if any of our readers were to contribute any facts bearing on their subsequent history.

It may here be suggested that advantage might be taken of the forthcoming Exhibition at Philadelphia to secure much valuable information, which it would be beyond the power of any individual, or even an association, to obtain at any other time, but which, once collected, would be of the greatest service to metallurgical industry. Though some may still cling to the selfish policy of retaining and jealously guarding, as so-called trade secrets, all information derived from their daily technical experience, it is generally perceived that by such hoarding more is lost than gained. It is not, even now, too late for the Commissioners of England, Germany, France and Austria, in conjunction with the American Centennial authorities, to invite by circular the leading metallurgical firms of their respective countries to furnish, in a specified form, such detailed particulars, illustrated as far as possible by plans of the working of the plant and processes under their control, as they may feel disposed to give. Such information from reliable sources would at once set at rest many vexed questions, which would otherwise only be tardily solved at an enormous cost of unproductive labor and wasted material. That we ourselves have much to learn from the best Continental and American practice, is not less true than that in many points we are in advance of our neighbours. Not the least important feature in such a programme would be the collection of a series of internal sections of blast furnaces blown out for repairs or other causes (of which there are, unfortunately, just now only too many). Accompanying these fire shaped sections would be drawings of the original contour, with full details of the charges used, and the working immediately before the stoppage, and at different periods of the campaign. Such returns would form a solid basis for subsequent progress, and would materially advance that which should be the leading object of a true world show—the growth of technical knowledge. Failing its adoption by official representatives, we commend the idea to such bodies as the various societies of engineers, the American Institute of Mining Engineers, and our own Iron and Steel Institute.

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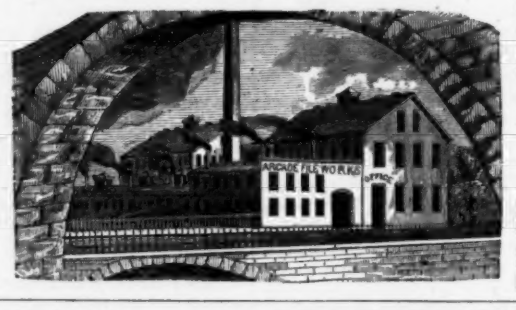

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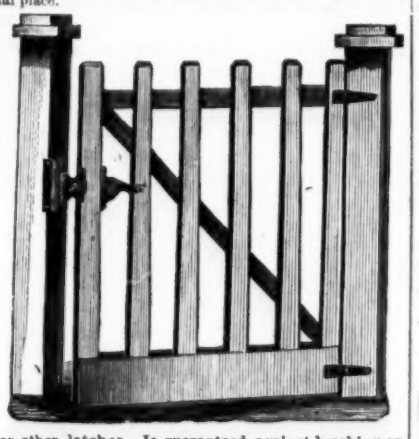

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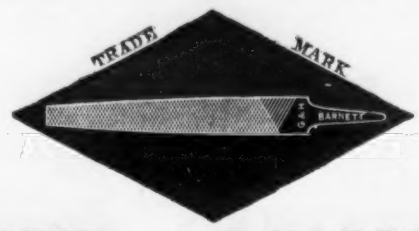

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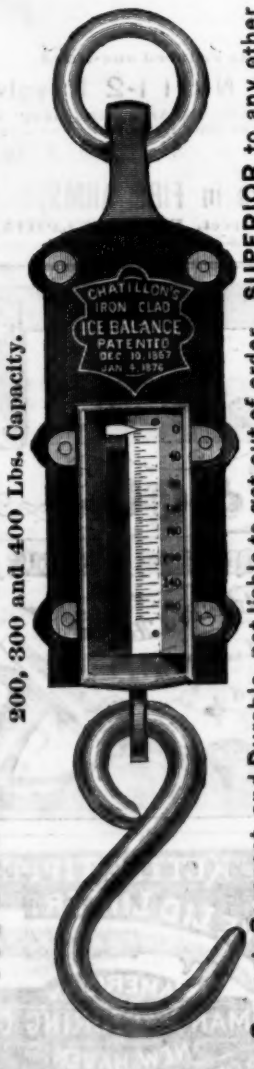

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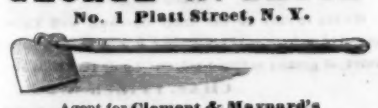

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The Work of the Molly Maguires.

The confession of James Kenigan, under sentence of death for complicity in the Molly Maguire murders in the coal regions, has been given to the public. It merits the careful consideration of the Pennsylvania authorities:

Some years ago Alexander Campbell kept the same saloon that is now kept by James Carroll in Tamaqua. In that house when Campbell first kept it I first joined a society known as the "Ancient Order of Hibernians." That is the order of the Molly Maguires and nothing else. I was introduced into it by a man at Tuscarora, and a man named John Donohue initiated in Alexander Campbell's cellar. The first taste of my new order was when Barney O'Hare was burned out. The men who did that were sent out by Alexander Campbell, who was paid for sending them by a man named Slatterling. I know he did send them, for I was in Campbell's place when they went, and the next morning the place was burnt down. The purpose of the Molly Maguires, or A. O. H., is to kill people and burn down buildings. The notion is that it is to protect workingmen, but really they are all of the most hardened villains in the place where they reside. The charter of the Molly Maguires calls for the Ancient Order of Hibernians. The murder and other appointments are seldom made in regular meetings, but at special meetings outside, called for the purpose. The regular meeting minutes are kept as those of any society, so they may be shown in contradiction of charges, and to show that they live up to the requirements of the charter. The appointments are made and always carried out. If any one want any work done they inform the head man, known as Bodymaster or President, and he calls a meeting. Two or three men are usually appointed to do such work. Most of the Bodymasters are hotel keepers. Jeremiah Kane was Bodymaster at Broad Top. When Jones was killed James Carroll was Bodymaster at Tamaqua. Alexander Campbell, while he lived at Tamaqua, was Bodymaster. Boyle, Duffy and McGeehar, now awaiting trial in the jail at Pottsville, are the men who, on the night of July 5th, at James Carroll's saloon, in Tamaqua, announced that Night Officer Yost must be killed. He was put out of the way because he had interfered with and beaten some drunken Molly Maguires. Carroll went out of the saloon to borrow a pistol to do the killing, but came back without any. He then gave me 25 cents, and asked me to go to a neighboring saloon and borrow one. I went out and spent the money, but returned without a pistol. He was killed that night. All three, Boyle, Duffy and McGeehan, subsequently confessed to me that they had murdered Yost. These men are all members of the Ancient Order of Hibernians, or Molly Maguires. I knew John P. Jones. I know all about his death. I did not know Doyle and Kelly before September 1, 1875. I was coming from my work at Alaska collieries, at Tamaqua, on September 1, 1875, and stopped in at James Carroll's. Doyle and Kelly were there. After I had taken a drink, I went out on the porch, and James Carroll followed me. When we got outside he asked me if I would take Doyle and Kelly over to Alexander Campbell's, at Storm Hill, as they wished to go there. I said that I was steadily at work, and would have to be out by 11 o'clock. Carroll then prevailed upon me to go. I got my supper and came back to Carroll's saloon. We pushed right on to Storm Hill, and went in at Alexander Campbell's, where Carroll had told me to take the men. We then went to Hugh McGeehan's saloon, at Summit Hill. McGeehan produced three revolvers. After oiling them he handed one to Doyle, one to Kelly and one to me, and asked me to go and shoot John P. Jones. I refused the revolver. Kelly and I remained in that saloon all night, McGeehan and Campbell both returning home. Before the latter left, an arrangement was made whereby I should go down the next morning and point out to Kelly and Doyle the boss (Jones), whom I knew, having once lived at Tamaqua. This was to be done so that no mistake might be made, so that they should know Jones beyond all doubt. The men, McGeehan and Campbell, said that John P. Jones had blacklisted (that is, discharged and reported so they couldn't again get work at any of the company's mines) some of the men that worked in that region Campbell left me to infer that Jones was to be murdered, mainly so as to get Wm. Zehner to run away. He said that if John P. Jones was shot, Bill Zehner would certainly run away, and to this McGeehan added, "Yes, by ——, if he don't, why we will give him a ball or two, after this Jones' business cools off." McGeehan and a man named Mulhall were among the black lists. In the morning Doyle, Kelly and I left the saloon about eight o'clock, in search of Jones. Campbell said they should shoot Jones at his house or coming from the post office. Then Kelly and Doyle went up to Jones' house. While they were away, Campbell made me get down on my knees and promise that I would never speak about this murder, drunk or sober. Then Campbell told me to go out and see where they were. I went up after them and met them this side of Mickey O'Donnel's tavern. Doyle was sitting on a stone. Kelly said that when he went down he went into a house and asked if Jones was at home and that no one answered. Campbell told Kelly to shoot Jones early in the morning while coming to work, and not to let him go with one ball, but put three or four in him. Michael Doyle had the blackjack and black pistol. Kelly had the other two pistols. Campbell told them they could go on; that they needn't be afraid, as no one would follow them, as Jones wasn't liked by the Welshmen or anyone else. Campbell then gave me $5, telling me to purchase some whisky at Tamaqua and use the balance to buy them tickets on the railroad to go home with. These $5 I gave my old woman, and she sent out for a quart of whisky, but the bill came back unchanged and the whisky with it. At Tamaqua Doyle informed me that they had shot Jones, but couldn't say whether he was dead or not. Shortly after that we were arrested.

Accomodations at Philadelphia for Visitors.

From present appearance it is reasonable to conclude that visitors to the Centennial will find no difficulty in securing accommodations in or near Philadelphia at reasonable rates. The fear that the accommodations would be insufficient has led to the provision of accommodations so ample that, after the excitement of the opening, it is probable that the competition to secure boarders will lead to low rates, and that many of the expectations now entertained by people with rooms to let will be disappointed.

Philadelphia has a population of nearly three-quarters of a million, which will be prepared to receive at least 190,000 visitors, beside those who will find accommodations in the suburbs. Of this number the hotels will be able to receive nearly 20,000, several temporary hotels having been built to increase the accommodation of this class. Five of these hotels accommodate each 1000 guests and upward. They are: The Continental, 1500; Transcontinental, 1000; Globe, 1000; Grand Union, 1500; St. George's, 1200.

Beside these, there are about 50 other hotels in the city, the capacities of which range from 800 to 25. Of course, many of these possess only second-rate accommodation, but the greater number, including those enumerated above, possess all the comforts and style which American hotels alone can give. As to charges. The proprietor of the United States Hotel, one of the leading establishments—and, although smaller than the five we have named, still accommodating 500 guests—states that his scale of charges will range from $3·50 to $4·50 per day, according to the nature of lodging offered. It must be understood that these prices include all charges for living upon the most liberal scale, and those we have just quoted appear to represent the average tariffs for first-class accommodation. Boarding and lodging houses will also abound in numbers, and the prices charged in these will, of course, be variable, but in all cases they will be regulated by mutual agreement.

The suburbs of Philadelphia are extensive, and the outlying towns within easy access will also offer almost unlimited accommodation. A very large number of visitors will doubtless make New York their headquarters, as special train services between that city and Philadelphia will be organized, by which the length of the journey will be reduced to less than two hours. Upon the line of the Pennsylvania Railroad lie a number of small towns, all of which possess more or less hotel accommodation, which will be placed at the disposal of visitors.

The reception capacity of Philadelphia, its suburbs and the outlying towns may be summarized as follows:

	No. of Guests.	
Philadelphia:		
City hotels	17,000	
City boarding houses	40,000	
Lodging houses	35,000	
Private houses	100,000	
		192,000
Camden:		
Hotels and boarding houses		8,000
Suburban Hotels:		
On Pennsylvania Railroad	1,170	
On West Chester Railroad	640	
On North Pennsylvania Railroad	1,404	
On Philadelphia, Wilmington and Baltimore Railroad	430	
		3,644
Outlying Towns:		
Norristown and Bridgeport	1,200	
Media	900	
Chester	650	
Haddonfield	300	
Downington	550	
Phœnixville	250	
Wilmington	2,000	
Beverley	1,300	
Trenton	3,500	
Bristol	300	
Marietta	500	
Lancaster	4,000	
Reading	1,200	
Bethlehem	600	
Allentown	635	
York	1,200	
Lebanon	650	
New York	6,650	
		26,475
Seaside Resorts:		
Cape May	20,0 0	
Atlantic	20,000	
Sea Grove	1,200	
Sea Girt	1,000	
		42,200
Total		272,319

From letters written by the mayors of the various outlying towns, it would appear that the prices to be charged are in many cases far lower than those already quoted for Philadelphia. Thus, at Trenton, the hotel tariffs range from $2 to $3·50 per day, or from $10 to $25 per week; those of Reading from $1·50 to $3, or weekly from $7 to $15; those of Bristol are $3 per day, or $15 per week; those of Lancaster from $2 to $3 per day, and so on, while lodging rooms, without board, will be about $3 per week. Boarding house charges are equally low, ranging from $7 to $25, according to circumstances. It must be remembered, too, that these are currency prices, and that the value of the dollar is somewhat less than 4/. The figures given above as representing the hotel capacity of New York, refer only to the seventeen leading houses, and is not one tenth part of the total capacity including second-class hotels and boarding houses. As regards the last section of the summary we have given above, namely, the seaside resorts, the distances from Philadelphia are too great to recommend them as head-quarters. Cape May is 81 miles distant, and the other three towns labor under a similar disadvantage.

Casing for Steam Pipes.—The German *Journal of Woolen Manufactures* gives the following for casing steam pipes: Mix fuller's earth that has been used and collected in sinks for this purpose, as well as to prevent the filling of streams, with fully the same quantity of coal ashes, and add to the pasty mass as much calf's hair as it will take up. Before laying it on, add one-eighth its quantity of calcined gypsum, and lay it on in thin coats. If the first layer does not adhere well, unused fuller's earth may be used for it.

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VULCAN TRADE MARK. HARVEY W. PEACE & Co. SAW WORKS.

MANUFACTURERS OF EVERY KIND OF

Patent Ground Saws,

CIRCULARS, CROSS-CUTS, MILL, MULAY, GANG, HAND, & BUTCHER.

Molding and Planing Knives, Plastering Trowels, Mitering Rods, &c.

FACTORIES:

Union Avenue, Tenth & Ainslie Sts., BROOKLYN, E. D., N. Y.

OFFICE & WAREHOUSE, 59 Beekman Street, New York.

E. C. ATKINS. *ESTABLISHED 1857.* H. KNIPPENBERG.

E. C. ATKINS & CO., Indianapolis, Ind.,

Saw Manufacturers and Repairers.

Sole manufacturers of the celebrated

GENUINE SILVER STEEL DIAMOND X CUT SAW.

$1.50 Per Foot.

Patent Secured

PATENT HANDLES AND GAUGE INCLUDED.

☞ BEWARE OF THE IMITATION CALLED "DIAMOND TOOTH." ☜

E. M. BOYNTON,

Manufacturer of

All kinds of First-Class SAWS,

Saw Frames, Cross-Cut Handles, &c.

Also, Sole Proprietor and Manufacturer of

LIGHTNING SAWS.

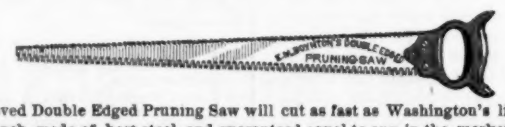
I have received from the agent of this celebrated Steel the following:

NEW YORK, February 26th, 1876.

E. M. Boynton, Esq., New York: DEAR SIR.—Your letter of to-day is at hand covering specification of 30,000 Cross Cut Plates. I beg to advise you that I accept your offer of the 11th inst. for 30,000 Cross Cut Plates of Thos. Firth & Son's make, "of the ***best quality they make*** for that purpose," ***warranted.***

Signed THOS. FIRTH & SONS, per JERE. ABBOTT, Agent.

My Lightning Cross Cuts, made of Firth's Best Steel, will be furnished at 50c. per foot, and a reduction of 10 per cent. will be finally allowed to parties sending unsolicited cash orders during April, May and June, and maintaining prices. Champion and other varieties of Best Common Teeth Saws at 40c. per foot made of American Steel of excellent quality, warranted, with 5 per cent. discount for cash on receipt of goods.



My New Improved Double Edged Pruning Saw will cut as fast as Washington's little hatchet. Price per doz., $7 for 18 inch, made of best steel, and guaranteed equal to any in the market. Ground 5 gauges on the back. Sample mailed on receipt of 75c.

Established 1826.

C. S. OSBORNE & CO.,

Manufacturers of

SADDLERS' & HARNESS MAKERS' TOOLS,

96 Mechanic Street, NEWARK, N. J.

"SUMMER QUEEN"

Oil Cook Stove,

FOUR SIZES.

SUITABLE FOR ALL PURPOSES,

For COOKING, BAKING and IRONING.

NON-EXPLOSIVE.

Address all orders to A. RIESSNER,

Wholesale Depot, 160 William Street, New York.

V. G. HUNDLEY.

79 Reade Street, New York. Agent for

North Carolina Handle Co.,

(WILSON & SHOBER, Proprietors.)

Manufacturers of *SPOKES, AXE, PICK, SLEDGE, HAMMER, HATCHET, and other Handles.* Full assortment always on hand.

Wheeler, Madden & Clemson MFG. CO.,

MIDDLETOWN, - - - - NEW YORK.

Manufacturers of

WARRANTED CAST STEEL

SAWS

Of every description, including

Circular, Shingle, Cross-Cut, Mill, Hand,

WOOD SAWS, Etc., Etc.

AMERICAN SAW CO.,

Manufacturers of

Movable Toothed Circular Saws,

PERFORATED CROSS-CUT SAWS

And SOLID SAWS of all kinds. Trenton, N. J.

GREENFIELD TOOL CO.,

Greenfield, Mass.

Sole Manufacturers of the Celebrated

"Diamond" PLANE IRONS,

EXTRA PLATED TABLE CUTLERY. PATENT FORGED OX SHOES. The only Shoe made with concavity to fit hoof. BENCH AND MOULDING PLANES of every description, &c., &c. Drop Forgings to order. Address for Catalogue with stamp.

VAN WART, SON & CO.

Hardware Commission Merchants,

EXPORTERS AND IMPORTERS,

BIRMINGHAM, - ENGLAND,

Agents,

VAN WART & McCOY,

184 & 186 Duane Street, N. Y.

George H. Gray & Danforth,

48 India Street, Boston.

F. W. TILTON,

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Rimmer & Son's Celebrated Harness and other Needles.

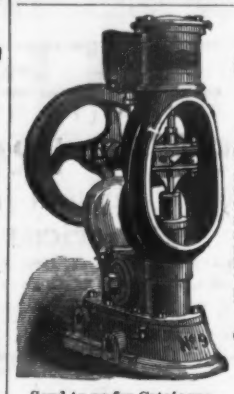
W. Clark's Genuine Horse Clippers.

Seydel's "Ashantee" Pocket Hammock

OSCAR IRVING VAN WART & Co.,

FORWARDING AGENTS,

2 South John Street, LIVERPOOL.



WASHINGTON, D. C., Sept. 18, 1875.

JNO MAYER,

Treas. Valley Machine Co., East Hampton, Mass.

DEAR SIR: The "Wright Bucket Plunger Steam Pump" you built for the Government "works like a top." Am sure it has never had its equal in any of the departments, and I have no hesitancy in recommending this Pump to any one in want of a first-class, noiseless Steam Pump. Very respectfully,

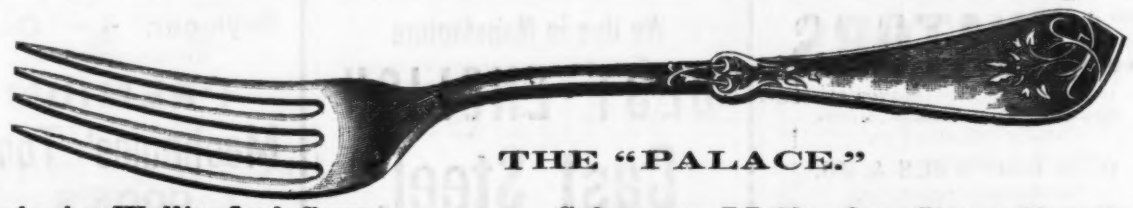
J. THOS. MILLER, Chief Engineer U. S. House of Representatives.

Send to us for Catalogue.

Valley Machine Co.

HALL, ELTON & CO.,

Electro Plated Ware German Silver and Britannia Spoons.



THE "PALACE."

Factories, Wallingford, Conn. **Salesroom, 75 Chambers Street, New York.**

IMPROVED DERINGER REVOLVERS.

No. 1, 22 Calibre; No. 2, 32 Calibre, Long Cartridge.

Cut Represents No. 2, 32 Calibre, 5 Shot. Size reduced one-third.

Exact Model of S. & W. No. 1 and No. 1 1-2 Revolvers.

These Arms are Half Nickel Plated and are equal in style of finish to the best Arms in the country. Quality of workmanship and material first-class; warranted. Price less than any other Hinge Barrel Cartridge Revolver of same quality in the market.

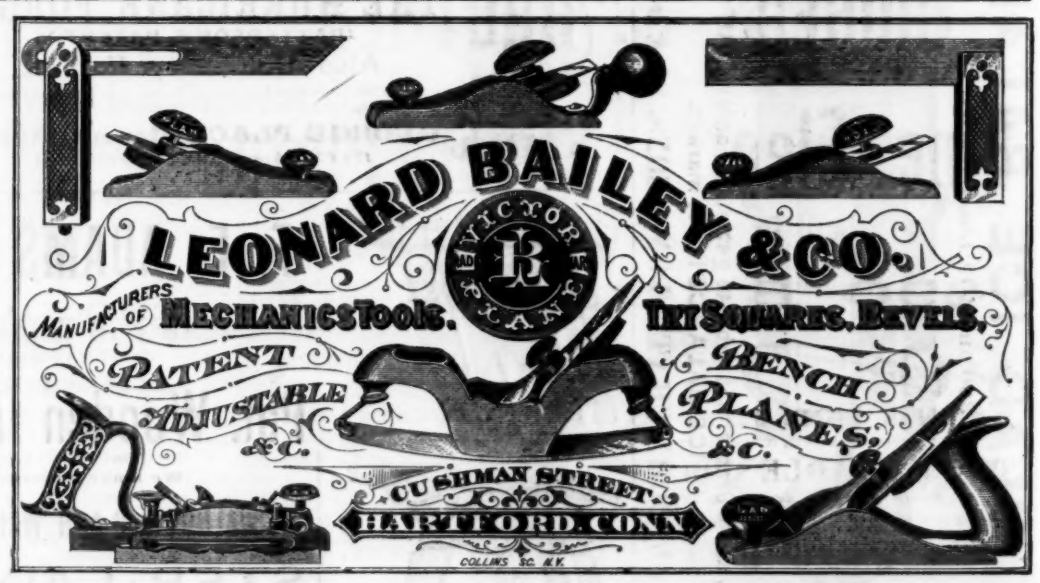
SOLE AGENTS:

EDW. K. TRYON, Jr., & CO., Dealers in FIRE ARMS,

No. 19 North Sixth Street and 220 North Second Street, PHILADELPHIA, PA.

THE VICTOR PLANES

Are the most simple, compact and practical Adjustable Planes ever offered to the public. They are made under the personal supervision of MR. L. BAILEY, the original inventor of L. BAILEY'S PATENT ADJUSTABLE IRON PLANES. All our Planes have our Trade Mark. Send for Catalogue, embracing Planes, Try Squares, Bevels, Rules, Levels, Hammers, Mitre Boxes, etc., etc.



ERIE Lawn Mower.

The gearing is so perfectly inclosed, that it needs no cleaning.

The revolving cutter is so constructed that it is impossible for grass to wind around the shaft.

Has adjustable cut.

Inside Gearing.

The most perfect Lawn Mower in the market. Has so *few parts* that *nothing can get out of Repair.*

Is so simple in construction that any one can understand it.

Works so easily that a child can run it. Does the work *so perfectly* that *all admire it.*

Manufactured by

H. M. REED & CO.,

ERIE, PA.

BORAX.

We beg to offer to the trade our own well known brand of strictly pure crystalized Borax, in barrels and cases, at greatly reduced prices. Apply for terms at

CHAS. PFIZER & CO.,

Manufacturing Chemists, New York

Cutlery.

FRIEDMANN & LAUTERJUNG,

MANUFACTURERS OF

Pen and Pocket Cutlery, Solid Steel Scissors, Shears, Razors, Russia Leather Strops, Hones, &c.

Sole Proprietors of the renowned full concaved patent

"ELECTRIC RAZORS,"

And the celebrated **"ELECTRIC SHEARS."** Nik Bows.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

TABLE KNIVES AND FORKS OF **ALL** KINDS,

AND ORIGINALLY EXCLUSIVE MAKERS OF

Also the exclusive makers of the **"Patent Ivory"** or Celluloid Knife, which is the most durable White Handle Knife known. These Handles never get loose. Always call for the "Trade Mark"

"MERIDEN CUTLERY COMPANY" on the blade.

Warranted and sold by all dealers in Cutlery, and by the MERIDEN CUTLERY CO., 49 Chambers St., N. Y.

THE MILLER BROTHERS CUTLERY CO.,

Manufacturers of

PATENT FINE PEN & POCKET CUTLERY

WEST MERIDEN, CONN.

The **only Knives made** that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife.** We also make

NICKEL & SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by **Messrs. J. Clark Wilson & Co.,** No. 81 Beekman Street (who have a full stock of all patterns always on hand), and also by **Messrs. G. B. Walbridge & Co.,** No. 99 Chambers Street.

Naugatuck Cutlery Co.,

Manufacturers of **FINE**

PEN and POCKET CUTLERY.

FULLER BROTHERS, Sole Agents, 89 Chambers and 71 Reade Sts., N. Y.

JOSEPH RYALS, Collinsville, Conn.,

Manufacturer of **Patent**

SHEARS & SCISSORS.

Made by a new process **RECENTLY PATENTED** which enables me to produce goods that in quality, finish and general excellence surpass any. *All warranted Solid Cast Steel Blades.*

ROGERS & BROTHER,

MANUFACTURERS OF

Fine Electro Silver Plate,

Will Remove about May 1st to

690 BROADWAY.

KANN & SONS MFG. CO.

Manufacturers of **Albata & Britannia**

TEA and TABLE SPOONS,

Caster Frames, Ladles, &c.

88, 90 & 92 N. Holliday St., Baltimore, Md.

FURNESS, BANNISTER & CO.

Manufacturers of

Fine Table CUTLERY,

Cor. Nassau & Sheffield Sts.,

NEWARK, N. J.

ROMER & CO.,

Established 1837. Manufacturers of Patent Scandinavian or Jail Locks. Brass Pad Locks for Railroads and Switches. Also, Patent Stationary B. R. Car Door Locks. Patent Piano and Sewing Machine Locks.

141 to 145 Railroad Avenue, NEWARK, N. J.

Illustrated Catalogue sent on application.

X. L. C. R. X. L. C. R.

EMANUEL MARX,

IMPORTER OF

Table & Pocket Cutlery,

Solid Steel Shears, Britannia Spoons, Britannia Soup Ladles and Toy Casters.

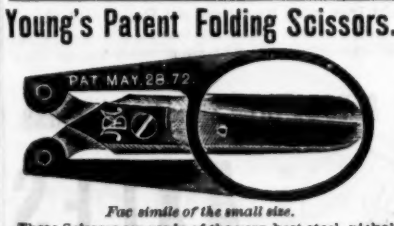
OFFICE & WAREROOMS, 106 Chambers Street, near Church, New York. Sent for Price List.

AMERICAN PEN AND POCKET KNIVES,

MANUFACTURED BY Aaron Burkinshaw. AB *PEPPERELL,* MASSACHUSETTS

My Blades are forged from the best Cast Steel, and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a Medal and Diploma from the Mass. Mechanics' Ass'n Sept., 1875.

Young's Patent Folding Scissors.



Fac simile of the small size.

These Scissors are made of the very best steel, nickel plated, and so constructed that they can be readily folded and carried in the pocket without injury to the garments. A sample pair will be sent by mail, *to the trade only*, upon receipt of the retail price, namely:

For small size, either blunt or pointed.....$1 00

Large size, pointed or half pointed..... 1 50

New York, Feb. 1st, 1876.

MARX BROS., Proprietors, 430 Broadway.

Cutlery.

Office of THE NEW YORK KNIFE CO., WALKILL RIVER WORKS, WALDEN, ORANGE CO., N. Y., Mar. 17th, 1876.

NOTICE TO THE TRADE.

We have this day withdrawn the Agency of our **TABLE AND POCKET CUTLERY** from ROWE, BABCOCK & POST, of No. 120 Chambers Street, New York, and placed our goods with THE WIEBUSCH & HILGER HARDWARE CO., of Nos. 81 and 86 Chambers Street, New York, who will act as our Agents, where a full line of our samples and goods may be seen.

We would caution our customers against buying goods stamped "NEW YORK CUTLERY CO." sold as Cutlery manufactured by THE NEW YORK KNIFE CO., Walden, Orange Co., N. Y.

THE NEW YORK KNIFE CO.,

THOS. J. BRADLEY, Prest.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

Table & Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.

JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm & Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &c

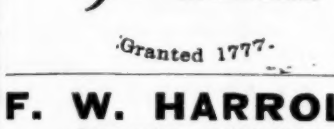
AGENT FOR

WALTER SPENCER & CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

Corporate Mark.



F. W. HARROLD,

Birmingham and Sheffield,

ENGLAND.

Importer on Commission

Of

HARDWARE, CUTLERY, GUNS, &c.

W. SANDERS, Agent,

78 Chambers Street, N. Y.

CORPORATE MARK,

Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam Power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

ASLINE WARD,

101 and 103 Duane Street, N. Y.

REPRESENTING

GEO. WOSTENHOLM & SON,

"LIMITED."

CUTLERY AND RAZORS,

Washington Works, Sheffield.

CORPORATE MARK.

FREDERICK WARD & CO., Sheffield,

Cutlery and Table Knives.

CORPORATE MARK.

PHILADELPHIA CORRESPONDENCE.

Office of *The Iron Age*, 220 South Fourth st., PHILADELPHIA, April 11, 1876.

The past week has been marked by a fair degree of activity in general business, and with the return of fine spring weather prospects are favorable for a continued improvement. The money market is again quite easy, and loans are readily obtainable at 5 to 7 per cent. on good commercial paper.

There is also some slight improvement in the coal trade, the cold weather having stimulated retail sales considerably. There are, however, large stocks at all the points of distribution, and indications of a further glut. The Reading Railroad is crowded with cars to such an extent as to seriously retard individual operators and shippers in fulfilling their contracts, and it would not be surprising if another suspension became necessary in course of a few weeks. The bituminous trade is in a better condition, and the operators and coal companies are pressing their coal into all the markets at low prices Many of the most experienced men in the anthracite trade are of opinion that nothing but lower prices will impart any stimulus or permanency to the trade. It is a matter of serious import to our Philadelphia shippers that New York is steadily encroaching upon their trade, as may be seen from the following comparison of receipts of coal at Boston, which for the week ending April 1, 1875, were:

From Philadelphia	37,082 tons.
From New York	11,107 "
Corresponding week, 1876:	
From Philadelphia	54,491 tons.
From New York	45,637 "

In the iron trade a very unsettled feeling continues, and there appears to be more uncertainty than ever in regard to the future. Producers say they have been losing money for some time past, and any further decline in prices must be a very serious matter. Great dissatisfaction is felt by some parties in the trade (by the majority, in fact) that a further reduction should have been made; they claim that it does not in any degree stimulate the demand, nor give any advantage to manufacturers, inasmuch as they have to reduce the price of their manufactured articles in precisely the same proportion. The outlook is very unpromising, but some of the leading concerns have determined to do no business at all unless upon the basis of prices current for some weeks past.

The large manufacturing establishments of the city continue to be moderately employed, and the improvement noted for two or three weeks past is fully maintained. The majority of the shops have a full complement of hands working full time, and in many instances are working over-time, and there is a fair prospect of a good summer's business. In the hardware trade business is rather slow, but it is probably due to the fact that many orders are held in abeyance until after the opening of the Exhibition, when it is expected that merchants from a distance will make their purchases in person.

Very satisfactory progress has been made during the week at the Centennial grounds. The arrivals are pouring in from all parts of the world, and there is abundant reason to believe it will not only be the largest Exhibition ever held, but it will also be the most successful.

The Corliss engine in Machinery Hall is in position, and was tested yesterday afternoon. Fires were lighted, water pumped, and slowly, inch by inch, the pressure of the steam went up in the gauges. Mr. Geo. H. Corliss, the inventor and builder of the engine, at 6·30 o'clock stepped to the starting wheel, and with 15 pounds steam pressure the 11 ton walking beams and the 70 ton gear wheel were quietly and smoothly put in motion. The action is said by the engineers to have been in every respect satisfactory. The following description of the engine is from one of the leading employes who assisted in its construction:

The weight of the entire engine is about 800 tons. It may be well to say that it will drive 8 lines of shafting, and will require 20 boilers to furnish steam, through connecting pipes which are out of sight, the trenches being almost completed and the pipes in position. It has the general appearance of two large engines, arranged side by side, with walking beams, and yet it is but one engine, owing to the connections which are made between the two; the beams tower very nearly to the apex of the roof, and the immensity of the machine can be better understood when it is stated that the fly-wheel alone is 30 feet in diameter, running in a cut in the foundations, constructed of brick, and weighs alone 70 tons. The engine is fitted with all the improvements known to engineering science, patent cut-offs, cylinders, heads, connecting rods, gearing, condensers, injectors and safety valves. Each side (which is connected with the other by the gear fly-wheel, joined to the main shaft beneath the floor, 252 feet long, and extending across the entire hall) is nominally a 700 horse-power engine, making 1400 horse-power in all, but with capacity of being forced up to 2500 horse-power. The cylinders, of which there are four, are 40 inches diameter, and the stroke is 10 feet. This is said to be the largest ever constructed, with one or two exceptions. It is fitted with air pumps and condensing apparatus, and is so arranged that it can be worked with from 20 up to 80 pounds pressure, as low or high power is needed. The platform on which it rests, with its gigantic columns, will be of polished iron plates, 55 feet in diameter, placed upon brick foundations, yet visible, and is elevated 3½ feet above the flooring of the hall. The fly-wheel is what is known as a gear wheel, that is the face (2 feet across) is cogged or teethed, the notches being 216 in number. The diameter is 30 feet, cast in sections, and weighs 56 tons. It will make 36 revolutions per minute, and is so nicely adjusted that its move will be noiseless, the accuracy of the notches, to the hundredth part of an inch, being most carefully tried and found true. The velocity of the circumference of the fly-wheel at 36 revolutions a minute will be about 38 miles per hour. The crank shaft is 19 inches in diameter, and 12 feet in length, made of the best hammered iron, and was forged upon an anvil plate that required to be specially cast for the purpose. The bearings of this shaft are 18 inches in diameter and 27 inches in length, and there are many of the boot-blacks seen every day who could crawl into them and take a nap. The cranks are of gun metal, polished like a mirror, and weigh over five tons. The walking beams are some 39 feet up in the air, that is on the pitch, and are of a new design, the top being an arc of a circle, and the bottom of two arcs of the circles inverted as to the top one, where it joins the piston rods. Through the center they are 9 feet wide, 27 feet long, and weigh each 11 tons. These beams are cast solid, in this particular differing from the fly-wheel, which is in sections, bolted and riveted, each spoke of the wheel being cast with a number of teeth on the periphery. The connecting rods are 24 feet in length, and are made of horse shoe cast iron, while the piston rods are made of steel, and measure 6¼ inches in diameter, and will have a velocity of 720 feet per minute. Toward the western end of the hall there is a large gear wheel, which cogs with the fly-wheel, the former being 10 feet in diameter, cast solid, 2 feet face, and weighing 17,000 pounds. To reach the upper portions of the engine for oiling, adjustment or tightening of screws and wedges, there are two iron staircases connected with balconies, which extend all around the machinery and make all points accessible to those who will be in charge. The steam chests, cylinders, valves, rods and columns will be enclosed by polished metal casings, so that while it will display power, the engine will also be to the eye of the visitor an illustration of the fact that "a thing of beauty is a joy forever." At the ends of the main shaft and at two intermediate points, and connected with the main, are shafts 108 feet long; the connection is made by the means of "nests" of beveled gear wheels, as they are called, 6 feet in diameter, at right angles with the main shaft and parallel to the sides of the building, carrying the power to points directly under the ends of the eight lines of overhead shafting. At the ends of these 4 connecting shafts are the main pulleys, 8 in all, 7 of them being 8 feet and one 9 feet in diameter, 2 feet 8 inches across the face. Each of these pulleys, by which the power will be distributed over the building, is under the end of a distinct main "overhead" shaft, to be connected by a double belt 30 inches wide and 70 feet long. This will make an aggregate of 20 feet width, of double belting, that being required to transmit the whole power. In the building there will be, when completed, 784 feet of main shafting; four nests of beveled gear wheels (three in a nest), each gear 6 feet in diameter, in addition to the large gear wheel connected with the others, which will be out of sight. The main pulleys above the floor are less than half the diameter of the gear wheels. The main belts will be passed through the hall, and so placed that they will not be in the way, or cause danger to visitors, and will be enclosed in glass cases, 8 feet by 6, so as to serve as an exhibition of the belts, three of the eight main belts having been prepared by the builder of the Corliss engine. The steam power will be furnished by twenty upright boilers of the Corliss pattern, of seventy horse-power each, with connecting pipes under the floor, which can be seen (a portion of them), 320 feet long, 18 inches in diameter, and made of wrought iron, double riveted. Such is the source of power for the machinery of the Exhibition, and taken in connection with the Worthington pump, will give such a display as no American need be ashamed of.

In the United States Department, toward the western end of the space, the zinc and iron companies of the Lehigh Valley, some 26 in number, will make a display of their products. The iron cases, 18 inches wide, and about 20 feet long, are now being placed in position. The exhibit will consist of iron ores, slags, fluxes, pig iron, manufactured iron, steel, steel rails and rolled iron and steel.

From Delaware, the Edge Moor Iron Company will exhibit one of its patent puddlers—a machine for doing the costly and difficult work of puddling, generally now done by hand. The company will also exhibit some specimens of hydraulic forging. The exhibit will be made in connection with that of Wm. Sellers & Co., of this city.

The census of Philadelphia has just been completed, and shows a population of 817,000, an increase of 140,000 in five years. These figures are believed to be correct, and speaks well for the steady and healthy growth of the city, and, if this ratio is continued until the close of the century, we shall have a population of over 2,000,000, and there is abundant reason to believe that these anticipations, sanguine as they may seem to be, will be more than realized.

The Wheeling (W. Va.) *Intelligencer* says: "The directors of the Benwood Iron Works held a meeting at the company's office, and instructed the committee of control to immediately take steps looking to the rebuilding of the works at the earliest possible day. The committee consists of Alex. Laughlin, Esq., president, and Messrs. John G. Hoffman, E. W. Paxton and C. Oglebay. The directors hope to have the work all under contract within a few weeks, possibly by the 1st of May."

The first engine to get in operation on the Centennial grounds is that of the Springfield Armory.

L. COES'

Genuine Improved Patent

SCREW WRENCHES.

Manufactured by

L. COES & CO.,

Worcester, Mass.

Established in 1839.

Registered March 31, 1874.

We invite the particular attention of the trade to our New Straight Bar Wrench, *widened*, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to *any* strain the bar may be subjected to.

These recent improvements in combination with the nut inside the ferrule firmly screwed up flush, against square, solid bearings (that cannot be forced out of place by use), verifies our claim that we are manufacturing the strongest Wrench in the market.

We would also call attention to the *fact*, that in 1869 we made several *important* improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were *at once closely* imitated and sold as the *Genuine* Wrench by certain parties who seem to rely upon *our* improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be *good* evidence that we manufacture a superior Wrench, we wish the trade *may not be deceived* on the question of *originality*. Trusting the trade will fully appreciate our *recent* efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

"L. COES & CO."

Warehouse, 97 Chambers St., & 81 Reade Sts., N. Y.

HORACE DURRIE & CO., Sole Agents.

M. H. Jones. A. C. Peck.

M. H. JONES & CO.

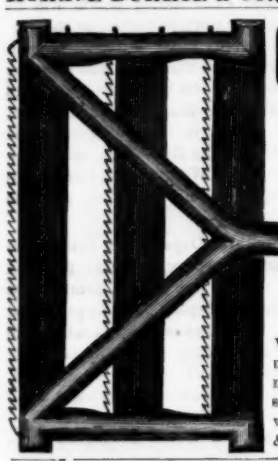
COHOES, Albany Co., N. Y.

Manufacturers of AXES AND EDGE TOOLS.

All Goods Stamped and Labeled M. H. JONES & CO. unless otherwise ordered.

Sole right to the use of the TEN EYCK AXE MFG. CO.'S Trade Mark.

HORACE DURRIE & CO., Agents, 97 Chambers and 81 Reade Streets, N. Y.



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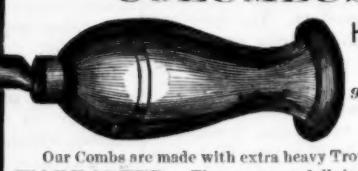

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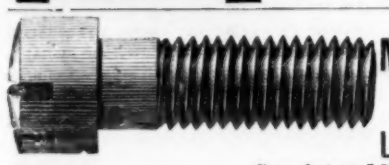

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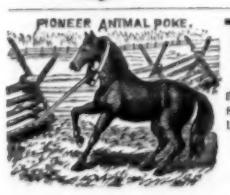

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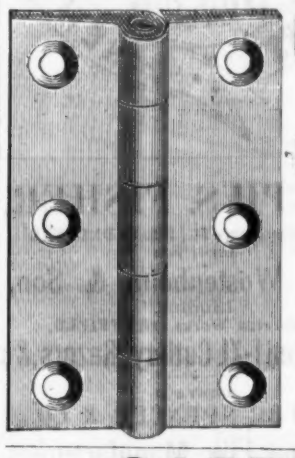

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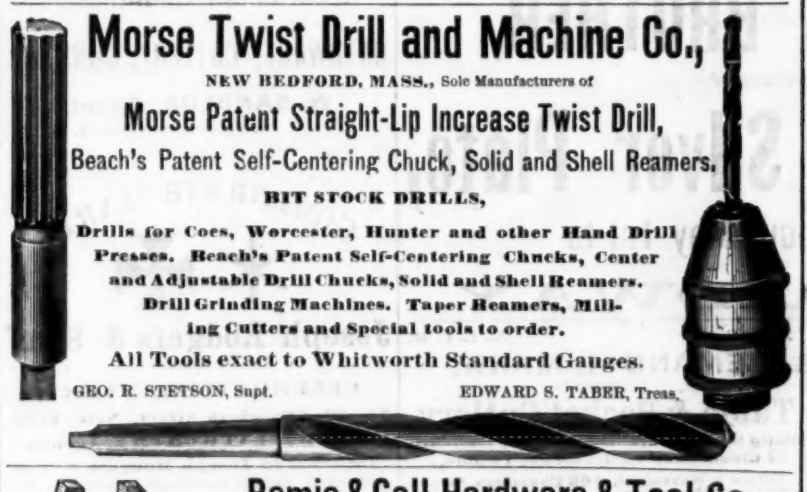

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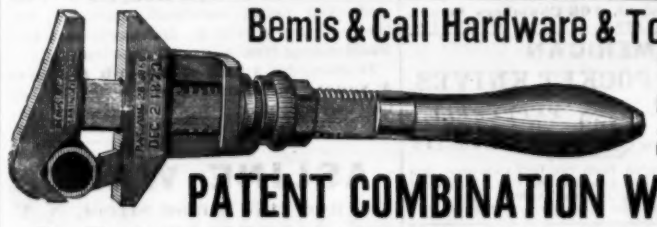

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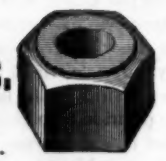

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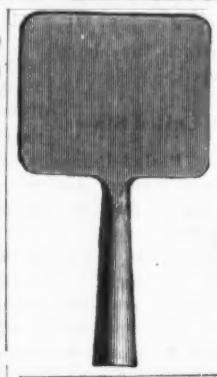

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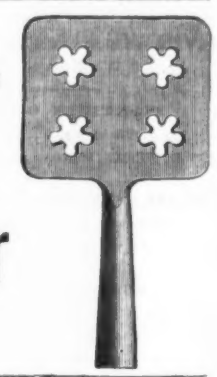

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New York, Thursday, April 13, 1876.

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JAMES C. BAYLES - - - *Editor.*
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The Great Fluctuations in Iron.

For many months past advices from Great Britain have told but one story concerning the condition of the iron trade of that country—dullness and depression everywhere, and in most localities utter stagnation, accompanied by failures and suspensions. Reports from the Continent, though not indicating a general depression as extreme as that which prevails in England, show that nowhere are the iron masters enjoying prosperity. Even in Belgium the business is dull and unprofitable for a majority of those engaged in it, and the guerilla war which the agents of Belgian manufacturers manage to maintain in England, demoralizes the British iron trade without bringing to Belgium many profitable British orders. Wherever we look, we see the iron trade languishing. We might cut from almost any one of our foreign exchanges a market report which, with a few unimportant changes of names, dates and prices, would answer for a report of the iron market in this country. Obviously, then, the causes operating to produce stagnation in the iron trade are not local. In every country the market is, of course, more or less influenced by local conditions, but behind and beyond all these there seem to be causes operating to check the large consumption of iron, which more or less directly affect the interests of large producers in all countries. We are apt to overlook these general influences, and limit our investigation of the causes of stimulation and depression to those which are purely local; and yet we see that, within certain limitations, iron manufacture is active and profitable, or dull and unprofitable, on both sides of the Atlantic at any given time, and that the changes from one condition to the other are, as nearly as possible, simultaneous. A careful examination of the history of the iron trade for the past twenty or twenty-five years will show so close a coincidence of periods of activity and stagnation in the great iron producing countries, that it becomes interesting to inquire whether we cannot discover the general law of trade which regulates these changes.

In our judgment, they are due to the fact that, from a variety of causes too complex to be considered, the world's progress toward a high and uniform standard of material civilization, is in some respects unsteady. At one time the spirit of progress will seem to be at work all over the world, inspiring governments and people to press forward in the direction of a larger and fuller development. At such times iron, the prime element of our modern material civilization, is in universal demand. What influence it is that quickens the heart throbs of national life, prompting vast outlays in the building of railroads and bridges and telegraphs, in the improvement of cities and towns, and in extending to nations not fairly within the busy circle of the world's activities and industries, the facilities for a close intercourse with the centers of civilization and commerce, it would be difficult to say. But such influences are sometimes powerfully active, and it seems as if the thrill of a new life were quickening the whole world. But these influences are not constant in their operation. Gradually the onward march of progress slackens, and then it seems to stop for a time. Six years ago the mail and telegraph rivaled each other in telling us of the great schemes of national and international improvement undertaken and projected. Great Britain and the Continent were busy with railroads and engineering works; Egypt, suddenly awakened from the sleep of centuries, was about to project into the heart of Africa lines of railways which would pour into the Valley of the Nile a wealth greater than that of the Pharaohs; Europe was to be brought into close communication with the Orient by a vast system of trans-Asiatic railways, and China and Japan were to be opened to the civilizing influence of commerce through the same mighty agencies. These grand schemes, legitimate offsprings of the Suez Canal, bred a confidence in the success of lesser undertakings all over world. For a time railroad building seemed to be the great business of civilized nations. In this country we carried it to the utmost limit of safety, if not far beyond, and probably our worst resulting misfortunes are due to the fact that we attained such an impetus in our headlong progress that we could not stop when the time came without shock. With us progress now seems to be at a standstill; but if we look abroad we find that it is at a standstill everywhere. The great schemes are, for the time, at least, abandoned. Persia, which was to be modernized under the direction of Baron Reuter, withdrew the concession and relapsed into contented semi-barbarism; Egypt, without timely foreign aid, would be bankrupt; China and Japan are not ready for development at the hands of foreigners, and the British and European capital which it was expected would find investment in railroads, cables, mines and steamship lines the world over, looks with suspicion upon all investments which do not promise more of security and profit than are now offered in most of the engineering works projected away from home. When the world's progress was most rapid iron steadily advanced, and the supply seemed scarcely equal to the world's requirements; when it slackened and seemed almost to stop, the demand fell off, prices declined, works were closed and the iron trade languished the world over.

How long this state of affairs will continue we cannot say. But this much is reasonably certain: presently we shall witness a gradual change, and before we know it we shall have entered upon another era of what may be called our intermittent progress. The improvement may begin here or it may begin abroad, but wherever it begins it will spread in widening circles until the wave touches on the furthermost shores of the civilized world. Examining our own condition, we find everything favorable to a revival of industrial activity. Probably the Centennial will have the effect of quickening the sluggish pulses of trade, and from the beginning thus made we expect to witness a steady development until we are once more in the enjoyment of a satisfactory and general prosperity. Looking abroad, we find the conditions favorable to a more general and profitable industrial activity the world over. The tendencies of the times are in the direction of universal peace. Wars have become too costly a game even for "kings to play at," and arbitration is securing recognition as a settled principle of international polity. The famous epigram of Wellington that "in war, nothing is so disastrous as victory except defeat" has been profoundly impressed upon the minds of European peoples by the Franco-German conflict and its train of attendant evils. Probably we shall see the beginnings of a general revival about the time we are ready for it here, and we shall share in it—provided we are out of the currency slough, and our commerce is once more established upon a firm and stable specie basis. If not, we may be able to make but a tardy following in the wake of the world's progress. The first business of enlightened statesmen should be to take the question of our national finances out of politics. Stability is the indispensable prerequisite of prosperity; and no stability is possible while party leaders are haggling over financial problems which they do not comprehend, and party voters cast their ballots to determine questions which they have never intelligently considered.

The Cost of Iron in the United States.

Mr. Wm. E. S. Baker, of Philadelphia, Secretary of the Eastern Iron Masters' Association, has brought down to date the table he compiled for us some years ago, showing the cost of iron since 1350, and in its complete form we print it on the opposite page. Mr. Baker's figures are compiled with great care, and fairly represent the cost of pig and bar iron at works in Pennsylvania favorably situated for economy. Some furnace and mill owners can probably make iron for less than the totals given in Mr. Baker's table: a great many others think they can, and the results of mistakes of this kind as to the cost of iron, are found in the failure of upward of 40 per cent. of our iron works, East and West, since 1873.

Comparing the totals of cost for a series of years, we find that pig iron can be made cheaper to-day than at any time since 1863; while the cost of converting pig iron into bars is less than at any time since 1862. Examining the items entering into the cost of pig iron, we find that labor has been reduced to ante-war rates. In some places of which we know, labor employed in mines is down to 80 cents per day, and in others men can be had for the rough work about blast furnaces for 90 cents. There is no room for contraction here, nor can rates of wages be maintained on the present starvation basis unless we are prepared to see our workingmen reduced to a level scarcely above that of the agricultural laborer in England. With meat and provisions at present prices, workingmen cannot support even small families in comfort on 80 or 90 cents a day. The labor employed in rolling mills has not, as will be seen from the lower table, declined in the same proportion as blast furnace labor; but it is down very close to starvation rates in the East, especially as the men seldom have work more than half the time. Examining the cost of ore, we find that the furnaces are paying more by $2 per ton than in 1863. This is chiefly because of its scarcity near furnaces, and partly because of high rates of freight by rail. Looking at the cost of anthracite coal per ton of pig iron, we find that, notwithstanding a decline from the extortionate prices charged from 1865 to 1875, it is still nearly double the price of 1863. Here we find the effect of the monopoly which now controls the anthracite mines and their outlets. We shall have a few words to say on this subject further on. The price of bituminous coal has declined about in proportion to the decline in ore, for the reason that the sources of supply are so extensive and widely separated that no combination among producers is possible. The cost of pig iron per ton of bars has not been so low since 1851, and but for the high freights would cost the mill less than before the war.

The tables, and the conclusions we have taken the liberty of drawing from them, furnish material for much profitable thought. All that stands between us and the attainment of a cheapness of production which would place our iron in the world's markets in competition with the cheapest foreign irons of marketable quality, is the rapacity of the coal operators and the greed of the railroads. It is well known that the anthracite monopolists fix their prices two months ahead—a thing unheard of in any other branch of trade—and by combinations clearly illegal, control the amount of production, the price, and the cost of transportation and handling. The railroads arrange their tariffs so that they can pay ten per cent. on watered capital; and the policy of their management, in a majority of instances, is to so operate the wires that one end shall reach the Stock Exchange, and the other terminate in the breeches pockets of the directors.

With our present capacity for producing iron, it is obvious that its utilization depends upon the building up of an export trade; but before we can do this with a certainty of holding such advantage as we may gain, we must be able to reduce the cost of production even below the present lowest average. To secure a further reduction in the cost of materials, we must break up the coal ring and the railroad ring. This could be done, as we shall show in a future issue, by legal means; whether it will or not depends upon whether the iron markets of the East have the courage to grapple with the evils they have allowed to grow during the years of their prosperity.

Alexander T. Stewart.

With the death of Mr. A. T. Stewart, New York has lost a prominent, loyal, public spirited and benevolent citizen. This, far more than the fact that he has left an unestimated accumulation of wealth, makes the event one of public importance. With an enlightened self respect, very different in kind from the narrow selfishness which has characterized the business policy of recent owners of the Astor estate, Mr. Stewart employed the power of his great wealth in ways profitable to himself and largely beneficial to the public. In this city alone he gave employment to at least seven thousand persons. If he exacted from them a rigid and faithful discharge of their duties, and paid them for their services at current rates in the labor market, they knew that their positions were secure so long as they merited confidence, that their wages were secure beyond preadventure of even an hour's delay, and that every man's chances for advancement were just what he might choose to make them. Mr. Stewart has been considered a hard man by many, but no one who came in contact with him had reason to complain that he was not a just man. In his business policy he was always rigidly and inflexibly honest. His plan was to give a dollar's worth for a dollar, and he did it. Those who were unable to compete with him in business, have called him a monopolist whose chief aim was to crush and destroy opposition. The fact was that his genius for commerce, his vast resources of capital, and his unequaled facilities for doing business at a minimum cost, gave him advantages with which his rivals could not compete. In so far as his business was a monopoly, it was made so by the employment of legitimate means to increase and extend it. Those who most freely condemn him would have crushed him if they could. In commerce the race is to the swift and the battle to the strong, and no one can say that Mr. Stewart did not win the high position to which he attained by honorable and legitimate means.

Outside of New York, Mr. Stewart employed a vast army of busy workers, who will regret his death. In Europe he kept at least a thousand persons in his employment, and in various parts of the United States he owned and kept running 14 mills of various kinds. On Long Island he planted Garden City, which will probably attain in time the greatness he hoped to see it grow into during his life. During the war he was a liberal contributor to the support of the Union, and made many and great sacrifices of personal interests to maintain the integrity of the country. The only office to which he aspired was the secretaryship of the national treasury. Had this position been given him he would have filled it with conspicuous ability and integrity, and his administration of our national finances would probably have furnished a memorable page of our history.

Of Mr. Stewart's personal habits and private life very little is known. His few intimate friends speak well of him, and their opinions have vastly more weight than the idle gossip of news makers and scandal mongers. Certain it is that Mr. Stewart was a great man in many ways, a benevolent man, a loyal citizen and a conspicuously useful member of the community. In the interest of the thousands depending upon him, he has provided for the carrying on of his mills and his business, and the completion of whatever he had undertaken and left unfinished. The great business of his life will be closed up so gradually that ample opportunity will be afforded for all depending upon him to make provision for their future. Whatever may have been his faults, he leaves behind a memory which will be honored all over the world, and the story of his busy life illustrates, in a conspicuous degree, the wisdom of his guiding precept, "I consider honesty and truth great aids in the gaining of fortune."

The Western Iron Association.

The meetings held by the Western Iron and Western Nail Associations, in Pittsburgh, during the past month, have been the most important in their history, and have produced results that promise the greatest good to the entire iron interests of the country.

We have already given in our columns an account of the meeting held on the 15th of March by the Western Iron Association, and the changes in classification and prices there adopted. Previous to the adjournment of that Convention each and every mill present pledged its word that it would abide by the changes until the next meeting. As we have stated from week to week, there was the best evidence that they had kept their word, and when the Association reassembled in Pittsburgh on the 5th instant, reports were called for, and the evidence furnished showed not a single instance of cutting on the part of those present at the previous meeting, notwithstanding the most desperate efforts on the part of buyers to break down the prices. One of the largest buyers in the West had offered nearly every mill an order for 500 tons of iron on condition that the price be "shaded," and he confessed, after ten day's effort, that he was unable to place it. Some buyers, in their anxiety to ruin the new card, descended to absolute falsehoods, representing to mills that their competitors had made offers in writing at prices below the agreed price, but for once these stories had no effect.

In view of these facts we think we are justified in saying that the result of the meeting of the 15th of March has surpassed the expectations of its most sanguine friends, and is most surprising. It must be remembered that the market was weak, mills even pressed for money; they were tempted with offers of large orders, and were told that their rivals were not faithful; but they kept their faith, and found that their rivals had done the same.

The meeting of the 5th instant continued in session until early on the morning of the 8th. To show how well the manufacturers of merchant iron were represented, we give a list of the firms present:

(50 Companies including Pittsburgh members)

Lewis, Oliver & Phillips,
Jones & Laughlins,
Kimberly, Carnes & Co.,
Byers, McCullough & Co.,
Graff, Bennett & Co.,
Mullin & Maloney,
Etna Iron Co. (Limited),
Spang, Chalfant & Co.,
Reese, Graff & Woods,
Shoenberger & Co.,
H. Lloyd, Son & Co.,
Bradley, Reis & Co.,
Everson, Macrum & Co.,
Scottdale Rolling Mill,
Westerman Iron Co.,
Reis, Brown & Berger,
Phillips, Nimick & Co.,
Moorehead & Co.,
Lindsay & McCutcheon,
Wilson, Walker & Co.,
Carnegie Bros. & Co.,
Lewis, Dalzell & Co.,
Brown & Co.,
Ashtabula Rolling Mill,
Louisville Rolling Mill Co.,
Kentucky Rolling Mill,
Mitchell, Tranter & Co.,
Swift's Iron and Steel Works,
American Sheet and Boiler Plate Co.,
Cleveland Iron Co.,
Cleveland Rolling Mill Co.,
Lake Erie Iron Co.,
Union Iron Works Co.,
Akron Iron Co.,
Cartwright, McCurdy & Co.,
Falcon Iron and Nail Co.,
Brown, Bonnell & Co.,
Ohio Iron Co.,
Gaylord Rolling Mill Co.,
Globe Rolling Mill Co.,
Lawrence Iron Works Co.,
Wyandathi Rolling Mill Co.,
Milwaukee Iron Co.,
Hilmbacher Forge and Rolling Mill Co.,
LaClede Rolling Mill,
Ætna Iron and Nail Co.,
Girard Rolling Mill,
Youngstown Rolling Mill Co.,
Indianapolis Rolling Mill Co.,
Ashtabula Rolling Mill Co.

The previous action regarding prices was reaffirmed, and some further changes made in classification of hoops, heavy rounds and squares, tank and sheet iron. We give the corrected list in another place.

One strong indication of how this meeting was regarded was seen in the presence of several large buyers in Pittsburgh during the sessions. This is a sight that has not been seen for months The Iron Association might come and go, and but little attention was paid to its meetings, but now it means business and must be watched. We cannot doubt that this action and its results will have a most healthful influence on the whole iron trade. That it will all at once lift it out of the "slough of despond" into which it has fallen, or roll the burden from its back, we do not assert. The slough is too deep and the burden too heavy; but we believe that it will stimulate to a renewed and earnest effort to escape both, and, we believe, a successful

AVERAGE COST PER TON OF PIG IRON ON FURNACE BANK, AND OF MERCHANT BAR IN MILL, FROM 1850 TO 1876, INCLUSIVE.

Compiled for *The Iron Age* from Original Data, by Mr. Wm. E. S. Baker, Secretary of the Eastern Iron Masters' Association.

AVERAGE COST OF PIG IRON, 1850 TO 1876.

	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874 Mar. 1	1874 Dec. 31	1875 Mar. 1	1876 Mar. 1
Cost of Ore to the ton of Pig Iron...$	5 75	5 44	5 55	5 97	6 65	7 51	7 50	7 75	7 66	7 08	7 45	7 35	7 08	7 49	9 12	13 13	12 19	11 71	10 92	11 86	12 96	12 67	13 64	14 87	14 75	11 13	11 95	9 54
Cost of Coal to the ton of Pig Iron.....	3 70	3 36	3 65	3 23	3 53	4 63	3 90	3 89	4 06	3 26	3 49	3 26	3 68	3 42	5 41	9 66	7 55	7 44	7 11	7 41	7 08	8 59	7 28	7 45	7 90	7 98	8 01	6 79
Cost of Limestone to the ton of Pig Iron.....	93	96	1 09	1 06	1 38	1 26	1 16	1 14	1 18	1 15	1 21	1 17	1 11	1 20	1 93	85	2 65	2 76	2 51	2 14	2 44	2 08	2 04	1 98	2 03	1 66	1 14	1 01
Cost of Labor to the ton of Pig Iron.....	2 22	1 61	2 02	2 00	2 45	2 85	2 58	2 30	2 10	1 82	1 87	1 97	1 57	2 07	2 85	4 56	3 46	3 99	3 86	3 46	3 89	3 54	4 69	5	4 40	2 90	2 97	2 54
Cost of General Contingencies.....	1 65	1 98	2 03	2 62	1 99	2 62	2 91	2 16	2 73	2 83	2 83	2 86	2 67	2 35	1 66	2 01	2 03	1 98	1 90	1 96	3 67	2 77	2 93	3 00	2 39	2 12	2 10	1 73
Cost at Furnace Bank.....	14 25	13 30	14 34	14 88	16 00	18 87	18 05	17 24	17 73	16 14	16 85	16 61	16 11	16 53	20 97	32 21	27 88	27 88	26 30	26 83	30 04	29 65	30 58	32 41	31 47	25 79	26 17	21 61
Add interest on capital on a product of 6000 tons..	1 05	1 05	1 15	1 22	1 37	1 29	1 21	1 47	1 22	1 28	1 36	1 57	1 57	1 40	1 59	1 61	1 64	1 80	1 63	1 71	1 85	1 82	75	2 08	2 00	1 80	1 70	1 59
Total cost to the producer.....$	15 30	14 35	15 49	16 10	17 37	20 16	19 26	18 71	18 95	17 42	18 21	18 18	17 68	17 93	22 56	33 82	29 52	29 68	27 93	28 54	31 89	31 47	32 33	34 49	33 47	27 59	27 87	23 20

AVERAGE COST OF BAR IRON, 1850 TO 1876.

Cost of Pig Iron to the ton of Finished Bar Iron..$	25 65	24 90	25 71	25 25	42 17	42 64	32 84	33 34	30 61	26 54	25 61	25 35	24 36	27 90	41 40	68 60	50 77	50 64	44 53	43 29	43 63	40 52	49	43 24	4 20	31 69	29 13	25 19
Cost of Coal to the ton of Finished Bar Iron...	5 70	5 61	5 61	5 81	6 00	8 28	6 59	6 00	5 49	5 17	5 27	5 39	6 19	7 66	8 44	3 03	8 92	9 13	8 64	8 33	8 55	7 55	8 43	8 55	8 46	6 98	8 73	6 85
Cost of Labor to the ton of Finished Bar Iron..	0 43	0 17	0 37	7 05	15 12	14 70	12 85	13 06	77	10 68	0 90	1 12	11 78	5 4	8 94	27 45	20 61	22 02	19 87	20 65	8 57	7 70	21 55	20 37	9 02	14 37	16 87	15 74
General Contingencies.....	4 64	4 83	4 88	0	10 39	10 78	8 88	10 38	10 84	7 91	8 78	8 71	10 03	7 66	9 5	8 03	50	9 44	7 70	7 75	7 03	7 85	5 74	5 83	5 29	6 15	4 79	4 73
Cost in the Mill, finished.....	46 42	45 51	46 57	49 17	73 68	76 40	61 16	62 78	58 71	50 30	50 56	50 57	52 36	58 36	77 93	127 11	91 80	9 23	80 74	80 02	77 78	73 62	84 83	77 99	73 97	59 19	59 51	52 51
Add interest on capital on a product of 6000 tons..	9 56	1 49	1 54	1 50	1 80	1 63	1 59	1 89	1 65	1 60	71	90	75	1 77	80	2 80	2 0	2 05	96	2 09	2 15	2 20	2 22	2 25	2 10	1 74	1 86	1 70
Total cost to the manufacturer.....$	47 98	47 00	48 11	50 67	75 48	78 03	62 75	64 67	60 36	51 90	52 27	52 47	54 11	60 13	79 73	129 91	93 81	93 28	82 70	82 11	79 93	75 82	87 05	80 24	76 07	60 93	61 37	54 21

Quantity of Ore used to make 1 ton of Pig Iron, average of 20 years.....tons, 2·17·0·22
Quantity of Coal used to make 1 ton of Pig Iron, average of 20 years..... " 2·00·3·05
Quantity of Limestone used to make 1 ton of Pig Iron, average of 20 years..... " 1·04·3·22
The above group of furnaces used Juniata and Montour Hematite Ores, and a little Cornwall. The coal came chiefly from the Wyoming and Lehigh Valleys.

Quantity of Pig Iron used to make 1 ton of Finished Bar Iron, average of 16 years.....ton, 1·05·2·00
Quantity of Coal used to make 1 ton of Finished Bar Iron, average of 16 years..... " 1·16·2·19
The above rolling mills used Gray and White Pig Iron and Broadtop and Cumberland Coal.

one. In the West, especially, the amount of iron produced is not much in excess, if any, of the present consumption, and at even 2·50 card, firm, it would not be a high price; in fact, it would not allow that margin of profit that it should have. If the present policy of the mills regarding running is continued, we should not be surprised to find the selling price of iron the price named. We know that shrewd buyers are placing their orders at the present figures, anticipating a still further advance at the next meeting of the Association, to be held on the 20th inst., and we think they will not be disappointed.

Belgian Iron in England.

The following, which we find in the issue of *Iron*, last received, gives a better idea of the condition of the British iron trade than can be gathered from the market reports:

A meeting of iron workers was held at the Lion Hotel, Warrington, on Saturday afternoon. Mr. Thomas Morris, manager of the Haslam Forge and Pearson and Knowles Coal and Iron Company, one of the largest iron works in Lancashire, presided. The chairman said the present state of the iron trade in this country was more critical and its prospect darker than it had ever been at any time. Almost in every direction, with the exception of Warrington, trade was slack. At Middlesborough, that morning, one of the largest works in the North of England had stopped and told their men to go elsewhere to find work, and in the Black Country most of the workingmen were working half time. This he attributed largely to foreign competition, especially Belgium. Every ton of Belgian iron sold in this country was so much wages out of the English workingman's pocket. Into Wolverhampton, the very heart of the iron trade, the Belgians were sending sheets at £9. 10/ per ton, and bars at £7. 10/, and in order to compete with these foreigners the masters at Wolverhampton were making iron at a positive loss, but such a state of things could not last long. Actually, in Warrington, some of the wire works were being supplied with wire rods from Belgium at a cheaper rate than the Warrington Mills, next door to these very works, could supply them for. One of these Belgian travelers had the impudence to tell him that he could send plates into Warrington at £10. 10/ per ton, which would be equal to Lowmoor or Bowling iron, which was sold at £45 a ton. That man must have been either a madman or a liar. He knew it could not be equal, but buyers might take it and make it answer their purposes because it was a cheaper article. There was this consolation, that Belgian iron was vastly inferior to English, and in that fact lay the security of the English iron worker. English workmen were the best in the world, and the only way to beat Belgium was by maintaining their superiority of workmanship.

How do you like it, gentlemen? Had it not been for our policy of commercial legislation, which you consider so unphilosophical, and which your newly organized Iron Trade Association proposes "to grapple with," you would have been doing in our markets, during the past 10 or 12 years, just what the "impudent" Belgian drummers are doing in yours. There was a time when you could have snapped your fingers at Belgian competition, but now it is a serious matter. During the past 14 years we should have found British competition a serious matter, and if many of our manufacturers are but little concerned about it, the change is due to the fact that we did not follow your disinterested advice. Were we now to lose protection, we should still have the consolation of knowing that, generally speaking, American iron is vastly better than English, and in that fact lies the security of the American iron worker.

A bill has been introduced into the Ohio Legislature for the establishment of a School of Mines.

The Western Nail Association.

We speak in another place of the meetings of the Western Iron Association, held in Pittsburgh. These have been surpassed in time and representation by those of the Western Nail Association, held in the same city. This meeting began on the morning of March 2d, and adjourned finally on the morning of the 6th inst. Every nail mill in operation west of the Alleghenies was represented. A new card was adopted on a basis of 2·85, terms 60 days, or 2 per cent. off for cash, less 10c. per keg in lots of 200 kegs in one shipment. We give the new list in another place.

The most important action was an agreement among the members of the Association to put up a forfeit of $100 per machine, to be forfeited in case of any violation of the rules of the Association. An exchange, speaking of the action, says:

The agreement is made more effective than formerly by the adoption of a forfeit of $100 to the machine in any mill cutting this price. This looks more like business than the old style of "pon honor" agreements. Falstaff says "honor" will not mend a broken leg," but "$10,000 of a forfeit from a mill running 100 machines will go a good way toward mending a slight breach of faith. So the nail men think anyhow, and, as the man said who looked into the crater, we think "there's something in it."

That this price will be maintained admits of no doubt. Even if this matter of a forfeit did not cause it to be kept, the stock of nails, which is very small, would do so.

New Publications.

The Story of a House. By Violet-le-Duc, Translated by Geo. M. Towle.
Annals of a Fortress. By Violet-le-Duc, Translanted by Benjamin Bucknall.

We are indebted to Messrs. A. J. Bicknell & Co., No. 21 Warren street, for copies of the two delightful books whose titles are given above. M. Violet-le-Duc, is an eminent French architect and engineer, of ripe culture, wide experience and a literary ability far above the standard usually attained by gentlemen who do not make book writing their principal life work. In the Story of a House, we have a popular treatise on the theory and practice of modern architecture, interwoven with a story which is so well designed and admirably told, that we cannot fail to be interested in it from beginning to end. It gives us the story of how a charming modern chateau was built from the inception of the idea to its final completion: and as the young gentleman who superintends the work is an amateur, we learn with him the mysteries, simple and complex of the architects' and builders' arts. The work is full of useful instruction, presented so pleasantly that we learn without knowing it.

The Annals of a Fortress is a book of very different character, and, probably, of more general interest. M. Le-Duc is a military engineer, and every page of his romance gives evidence that he is a master of this profession. It gives the history of an imaginary fortress occupying a point of advantage somewhere in France between Lyons and Rheims. He supposes the site to have been occupied as a fortress from the earliest times—even before the Roman invasion—and by successive conquerors of the country to the present time. With each new occupation the works were remodelled to enable them to meet the new and improved engines of warfare which were likely to be brought against them, or to which they had succumbed. The narrative of the early sieges is especially instructive as introducing to our notice the rude but often formidable appliances at the command of the military engineers of the middle ages—such as the battering ram, the tower, the mantelet, the cat, Greek fire, and the catapult, all of which are shown in the construction and employment by the illustrations which adorn the pages. After the fourth siege, which was accomplished by the aid of gunpowder and ordnance, a radical change in the character of the fortifications was necessary, but the vast system of fortifications yielded to three subsequent sieges—making seven in all—which brings us to the present time. It was not attacked during the Franco-Prussian war, but we are led to believe that, if it had been, the results of all the vast expenditure of time and treasure would have been powerless to resist such a siege as the German artillerists could have conducted had they deemed its capture worth while. The author's conclusion is that the day of great fortifications is past, and that "the best fortress for a country is a good and well commanded army, and a well educated, brave and intelligent population, resolved to make any sacrifice rather than undergo the humiliation of foreign occupation." The book gives us the history of mediæval and modern warfare in the most charming style, and has all the interest of a brilliant romance. We regard it as a work of exceptional value, as fascinating as any of Jules Verne's extravagant imaginings, without setting either history or science at defiance.

Foreign Exchange and Premium Tables, designed for the use of Importers, Brokers, Bankers, Collectors of Customs, and dealers in Foreign Merchandise. Computed by A. J. Nugent. Published by the author: Cohoes, N. Y.

This is a valuable little ready reckoner of foreign exchange, which we commend to the favor of such of our readers as have use for such a volume. Looking over the contents, we find that the first 61 pages contain all rates to the pound sterling, on a currency basis, which are of use to importers of British manufactures. Following these are tables for reducing to a gold or silver basis the moneys of account of the principal commercial nations of the world. The concluding pages contain 35 premium tables, showing without the labor of calculation, how much must be paid for the use of a given amount of gold at a given percentage, also what is the value of any amount of currency in gold at any per cent. premium. The value and convenience of these tables, which have been compiled with great care and with a conscientious desire for absolute accuracy, will be seen at a glance. The book, which is of convenient size, is provided with a ledger index, so that one can turn to any part of it at once. It is a convenient and useful volume.

The American Architect and Building News. A weekly journal of constructive and decorative art.

Messrs. J. R. Osgood & Co., Boston, have favored us with a complete set of their new journal, the publication of which was begun January 1st. It is devoted to the general literature of architecture, and has been adopted by the American Institute of Architects as the medium for the publication of all matters which they desire to give to the public. The 15 numbers before us possess a varied interest for the non-professional as well as the professional reader. The illustrations, which are numerous and generally very good, are produced by the heliotype process. The journal is well edited and gives promise of success and profit. We are glad to see it among our exchanges.

The April number of "The Hub," which opens the "Centennial Volume" of that publication, is an unusually elegant one. The matter is varied and interesting, the illustrations good, and everything about it creditable.

The Western Card on Iron.

The following is the card adopted by the Western Iron Association on the 6th instant:

Flat Bar.

1½ to 4 by ⅜ to 1 inch	2·5
4⅛ to 6 by ⅜ to 1 "	2·6
1⅜ to 6 by 1⅛ to 1⅜ "	2·9
1¼ & 1⅜ by ⅜ to ¾ "	2·6
1 & 1⅛ by ⅜ to ¾ "	2·7
⅞, ¾ & ⅝ by ⅜ to ½ "	2·9

Rounds and Squares.

1 to 1⅞	2·5
2 to 2¾	2·7
2⅞ to 3⅜	3
3½ to 4	3·5
⅜ to ⅞	2·6
⅝ to 9-16	2·7
⅞ to 7-16	2·9
½	3·1
5-16	3·3
⅜	3·5
3-16	5·5

Horse Shoe.

All Sizes	3·5

Heavy Bands.

3½ to 6 by ¼ and 5-16 inch	2·7
1½ to 3¼ by ¼ and 5-16 "	2·7
1 to 1¾ by ¼ and 5-16 "	2·8
⅜ to ⅞ by ¼ and 5-16 "	3
⅞ & ½ by ¼ and 5-16 "	3·5

Light Bands.

3 to 6 by ⅛ to 3-16	2·8
3 to 6 by No. 11 and No. 12	3
1⅛ to 2¾ by ⅛ to 3-16	3
1⅛ to 2¾ by No. 11 and No. 12	3·2
1 to 1¾ by ⅛ to 3-16	3·2
1 to 1¾ by No. 11 and No. 12	3·4
¾ & ⅞ by ⅛ to 3-16	3·5
¾ & ⅞ by No. 11 and No. 12	3·7
⅝ & ¾ by ⅛ to 3-16	4
⅝ & ¾ by No. 11 and No. 12	4·2

Hoop Iron.

½ & 9-16, Nos. 13 to 16	5·2
¾ & 11-16, Nos. 13 to 16	4·7
⅞ & 13-16, Nos. 13 to 16	4·2
1 & 1⅛, Nos. 13 to 15	3·8
1¼ to 2, Nos. 13 to 15	3·4
½ & 9-16, Nos. 17 to 20	5·5
¾ & 11-16, Nos. 17 to 20	5
⅞ & 13-16, Nos. 17 to 20	4·5
1 & 1⅛, Nos. 16 to 19	4·1
1¼ to 2, Nos. 16 to 18	3·6
2¼ to 3⅛, Nos. 13 to 15	3·5

1-10c. per lb. extra for each gauge lighter.

1-10 cent per lb. extra will be charged for cutting to specified lengths.

Oval Iron.

⅞ to 1¼	2·9
⅝ to ¾	3·1
½	3·3
⅜	3·7

Half Oval and Half Round.

⅞ to 1¼ inch	3·2
⅝ to ¾ "	3·7
½ inch	4
⅜ "	5·5
Wagon Box Iron, ¾ and ½	4

Tank Iron.

3-16, to ½ inch	3·3
Boiler Plate	
Heads, not flanging	
" flanging	
Plow Slabs	3·5
" Wings	3·8

Sheet Iron.

	Common.	Charcoal.
No. 10 to 14	3·3	4·8
No. 15 to 17	3·5	5
No. 18 to 21	3·8	5·3
No. 22 to 24	4	5·5
No. 25 and 26	4·2	5·7
No. 27	4·4	5·9
No. 28	4·8	6·3

All Sheets No. 18 and lighter, over 30 inches wide, not less than 2-10 extra.

Extras for cutting to length 1-10 on all iron except tire. Terms—Note or acceptance at sixty days, or a discount of two per cent. for remittances within ten days of receipt of invoice.

THE NEW WESTERN NAIL CARD.

The following is the card adopted by the Western Nail Association, at their meeting, in Pittsburgh, on the 7th instant:

Nails, Brads and Fencing,	10d. to 60d.						$2·85
	8d. & 9d.						3·10
	6d. & 7d.						3·35
	4d. & 5d.						3·60
	3d.						4·35
	2d.						5·60
Inches	¾	1	1⅛	1¼	1⅜	1½	
Barrel	$5·85	5·35	4·60	4·35	3·85	3·60	
Inches	1	1¼	1½	2	2½	3	
Finishing	$7·85	6·85	4·85	4·60	4·35	4·10	
Casing	10d. to 30d.		$3·60	8d	6d.	4d.	
			3·85	4·10		4·35	
Fine Blued			4d.	3d.		2d.	
			$4·60	5·85		6·60	
Lining Nails, ⅞ inch						$7·35	
				6d. & 7d.		8d.	
Tobacco Hhd				$3·85		3·60	
Clinch Nails, all sizes						$4·60	
Cut Spikes, all sizes						3·10	
Boat Spikes, cut						3·60	

Less 10 cents per keg in lots of 200 kegs in one shipment.

Terms.—Note or acceptance at 60 days, payable with exchange, or 2 per cent. discount for cash, if remitted within 10 days from date of invoice.

"French Treatment of Slag," not French.

To the Editor of The Iron Age: In your issue of March 23d, page 3, you speak of a new French process for the profitable treatment of slag. At Charlotte Furnace, at Scottdale, Westmoreland county, and at Dunbar Furnace, Fayette county, Pa., this method of treating slag has been in successful use for several years past. The liquid slag runs into a tank of water, granulating the instant it touches the water, and is carried by elevators into a large bin, so arranged that dump or other cars can run directly underneath, and by means of traps be loaded in a few moments. There is nothing novel in this method, having been in use in Germany for years. Foundry slag is porous and very bulky; forge slag forms a coarse gravel. In very cold weather this method of manipulation is troublesome, as the ice forms around the doors of the bins, and the slag freezes to a certain extent in the cars unless promptly unloaded. Ordinarily, however, it is an easy, clean and cool way of handling slag.

At Dunbar, several efforts have been made to use the fine slag for pig beds, and for molding and facing sand in the foundry. Every variety was tried, but with absolute failure. So far from giving a clean, bright face to pigs or castings, both were rough and scraggy in the extreme. As soon as the liquid iron touched the material it was picked up and held fast.

Two years since, experiments were tried in brick making. Six parts of gray granulated slag ground fine were mixed with one part of quick lime, pressed and sun dried. The bricks in two days were set enough to handle, and at this date are practically stone. They were soaked in water and then exposed to a temperature below zero, without any change whatever. By changing the proportions the mass set so quickly as to prevent molding into bricks. There is no doubt but that furnaces in or near cities could by such use of slag make a large profit out of this hitherto waste material, as the color of the brick is a soft cream or dove tint, which could be made very effective. In fact any color could be given by dipping the brick after pressing. In our experience it would not stand fire at all, running away or melting, even in a burning kiln of ordinary red brick.

The use of the granulated slag as a fertilizer was pretty thoroughly discussed at a meeting of the British Iron and Steel Institute, and the conclusion there reached was that it would only act mechanically in opening a stiff clay soil.

For filling or widening railroad banks it is most admirable, as it never washes, no matter how steep the angle, and is much used in this section for back ballasting.

At the furnace of the Messrs. Robbins & Co., Philadelphia, the slag is granulated in a somewhat different way. It falls into an inclined tank, meeting a small stream of water, and is delivered by a screw into cars.

A party in Philadelphia, whose name escapes me, has a patent for making brick, but the patent must be simply on the mechanical device for forming the brick, as the brick itself has been made and used on a large scale abroad for years. Bodmer & Co., of England, have a machine for this express purpose, a drawing of which may be seen in any number of *Iron*, as an advertisement, and the papers of Mr. Bodmer on this subject can be found in the published volumes of the American Institute of Mining Engineers.

A furnace located near a ravine or depression could, by giving a descent of say one in ten, or even fifteen, by using the bosh discharge, carry the granulated slag a long distance, and thus easily and cheaply dispose of it. The above may possibly benefit some unfortunate iron master, whose only profit in these hard times may be what can be saved in handling his slag. E. C. P.

Dunbar, Pa., March 31, 1876.

The Ironton *Journal* says: "The Ætna Iron Works have at least 1000 tons of Ætna and Vesuvius charcoal iron on hand which nets about $45. They have sold more than 1000 tons since the 1st of January. The company received an inquiry a few days ago for 1000 tons of Alice iron, but they had not that amount on hand.

TACKS

FACTORY, Fairhaven, Mass. **AMERICAN TACK CO.,** SALESROOM, 117 Chambers St., N. Y.

Upholstery, Gimp, Brush, Card, Pail and Cheese Box Tacks; Leathered, Tinned and Iron Carpet Tacks; Bright and Blued Finishing Nails; Cigar Box and Chair Nails; Trunk and Clout Nails; Brads, Patent Brads, Copper Tacks and Nails; Iron, Zinc, Steel and Copper Shoe Nails; Polished 2d and 3d Fine Nails; Roofing and Slating Nails; Roofing Tacks, Tinned Tacks and Nails of every variety. Any size or style of Tack or Nail made to sample. Orders sent to either Factory or Salesroom will receive prompt attention.

MANILA Water Pails.

These goods we *Warrant* not to be affected by climate, or **water, hot or cold.**

Are Durable, Light, Strong and Tasteless, **have no hoops,** and will not absorb their contents. Orders from the trade solicited.

For samples or circulars, address,

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54 BEEKMAN ST., - - NEW YORK.

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Hardware and Machinery,

Gray Iron Foundries & Machine Works,
Hamilton, McWhorter & Bruen Sts.,
Malleable Iron Works,
M. J. R. R. Avenue, cor. Johnson Street. Store, 34 & 36 McWhorter Street, NEWARK, N. J.
Tinning, Galvanizing, Coppering and Japanning. Small Gray Iron Castings, Soft and Smooth.
P. O. Box 24. **Established 1845.**

JOHN MAXHEIMER,

Patented,
June 3, 1862; April 6, 1869
Dec 23, 1873; Jan. 20, 1874; Dec. 22, 1874.
April 20, 1875.
Manufacturer of

JAPANNED and PATENT EUREKA Bright Metal

BIRD CAGES.

Nos. 247 & 249 Pearl Street NEW YORK.

LEIGHTON BRIDGE AND IRON WORKS,

Rochester, N. Y.

Wrought Iron Riveted Lattice Railroad AND HIGHWAY BRIDGES.

Wrought Iron WATER PIPE,

The most economical and durable Pipe manufactured for Water Works, Oil Lines or Gas Mains.

General Riveted Work

Orders solicited from Civil Engineers and Contractors.

[Accompanying engraving represents the Springfield Bridge, built by the Leighton Bridge and Iron Works.]

SPRING PERCH CO., Bridgeport, Conn.

Established 1843. Manufacturers of FIRST QUALITY

SPRINGS & AXLES

And Beer's Patent Curtain Rollers, Concealed Hinges, Etc., Springs of any pattern made to order. Send for Circular and Price List.

OLIVER'S CHILLED PLOWS.

These implements, though but four years before the public in their present form, show the following remarkable record:

1506 were sold in the season of **1871.** **7472** were sold in the season of **1873.** **31,077** were sold in the season of **1875.**
3049 " " **1872.** **14,976** " " " **1874.**

The sales for 1876, will undoubtedly exceed 60,000 Plows, one-third of that quantity being now on our order book. For full descriptive circulars, address

SOUTH BEND IRON WORKS, South Bend, Ind.

CLARK'S PATENT EXPANSIVE BITS

Made of JESSOP'S BEST CAST STEEL, and warranted superior to any other.
Two sizes: Large Size Boring, ¾ to 3 inches; Small Size Boring, ⅜ to 1½ inches.

Manufactured by

WILLIAM A. CLARK, - - - Westville, Conn.

$20 00 to $25 00 per bbl. Saving.

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Of Cotton Linen and Steel.
For all purposes for which Tape Measures are required.
Only manufacturers of
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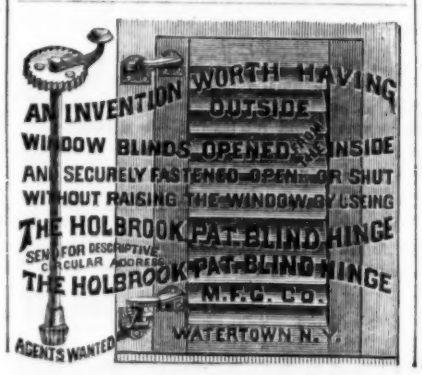
FINE TEMPERED STEEL SPRINGS, FINE TEMPERED STEEL BAND SAWS, From ⅛ inch wide upward. Warranted tougher than any other **Band Saw.** Catalogues on application.


AN INVENTION WORTH HAVING
WINDOW BLINDS OPENED OUTSIDE
AND SECURELY FASTENED OPEN OR SHUT
WITHOUT RAISING THE WINDOW BY USEING
THE HOLBROOK PAT. BLIND HINGE
SEND FOR DESCRIPTIVE CIRCULAR ADDRESS
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OF EVERY DESCRIPTION
MADE FROM BEST CAST STEEL AND WARRANTED.
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MOULDING KNIFE STOCK

MADE TO ORDER.
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Pails, Basins, Cuspadores, Slop Jars, Trays, Foot Baths, etc., etc., manufactured by
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Trade supplied. Hardware dealers should have these goods. A great success.

FOOT LATHES.

Address,
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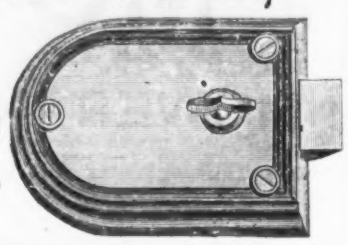
Catalogues free.

AMERICAN LOCK MFG. CO.,

Manufacturers of

FELTER'S

Locks & Latches,



Comprising

Store Door Locks, Night Latches, Drawer, Desk and Pad Locks,

All of which are furnished with

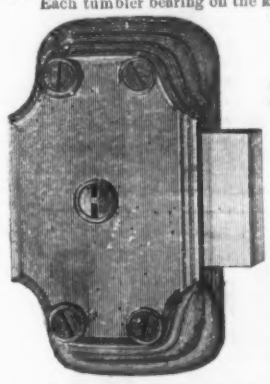
SMALL, FLAT, AMERICAN STERLING METAL KEYS,

Which are stronger than steel, ***and cannot be affected by rust,*** and will remain bright and clear under all ordinary circumstances.

A candid examination will convince the most unbelieving, that for simplicity, durability, convenience, and safety, they challenge comparison with any now before the public. Being made entirely by new and expensive machinery, especially constructed to manufacture them, ***they will rival the best made Locks in Finish and perfect operation.***

These Locks give perfect satisfaction, because they are the safest, cheapest and most durable Lock ever presented to the public, having ***thirty-five*** finely finished Brass Tumblers in each Door, and twenty-eight in each Drawer Lock, each one being finely false notched.

Each tumbler bearing on the key at two different points while locking or unlocking, without the aid of springs, which cannot be said of any other patent Tumbler Locks in use.



THE LOCKS ARE FITTED TO THE KEYS

And not the Keys to the Locks.

Hence Counterfeit Keys cannot be made.

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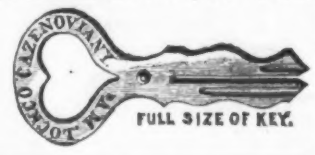
Or, **UNION NUT CO., Agents,**

78 Beekman Street, New York.



FULL SIZE OF KEY.

BAEDER, ADAMSON & CO.,

Manufacturers of

SAND & EMERY PAPER & EMERY CLOTH.

(Also, in Rolls for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felting for Covering Boilers, Pipes, &c., Cow Hide Whips

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Patented September 3, 1867, February 6 and 18, 1872.

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No Mistake about it this time.

The owners of these patents desire to sell them or to form companies to manufacture Files, File Blanks and File Handles under the *Royalty System*. Address,

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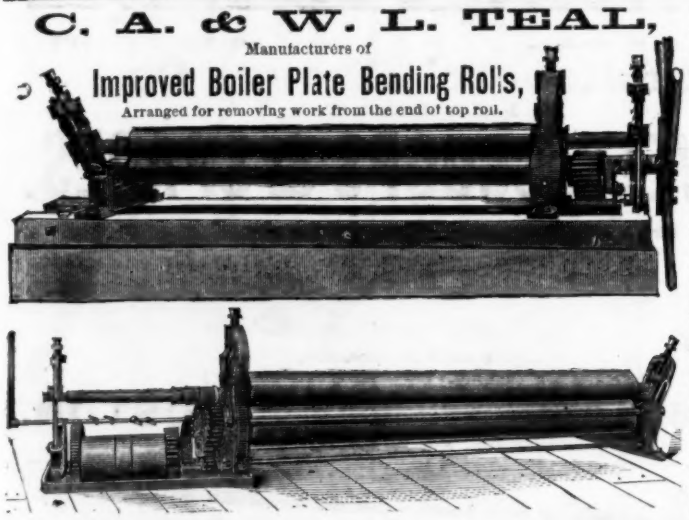
Improved Boiler Plate Bending Rolls,

Arranged for removing work from the end of top roll.



Boiler-Plate Planing Machines, Combined Punching and Shearing Machines and Single Power Punching Machines, with Shearing Attachments, for Rolling Mills, Boiler Makers, &c. Attachments furnished for Punching Nuts and Washers complete at one stroke. **Rotary Shearing Machines, Steam Engines,** with Teal's Balance Slide Valve, **Improved Hair Picking and Cleaning Machines, and Machinery in General.**

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These Machines are Automatic, combining simplicity, general utility, and great facility it their working.

Weighing apparatus can be attached to the machine and will weigh without cost.

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We use five machines most of the time, storing 300 tons in 10 hours with each machine and one man, at a cost of three cents per ton. When using three machines the cost is 1⅝ cents per gross ton.

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PUMPING ENGINES, for City and Town Supply, a Specialty.

60 to 96 Commerce Street, HARTFORD, CONN

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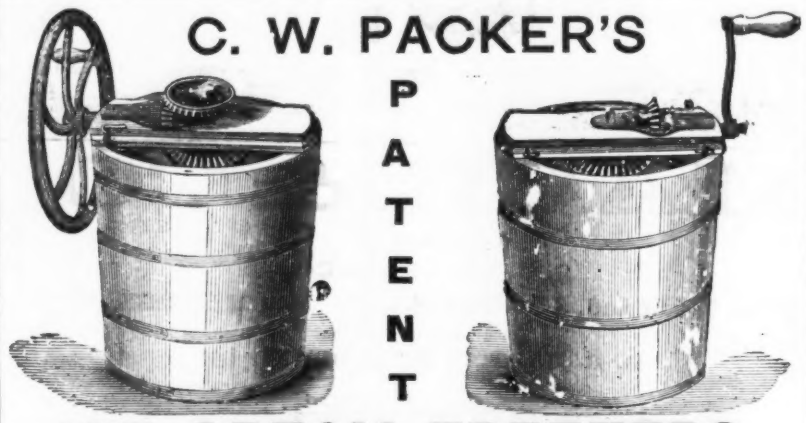

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DOUBLE ACTION FREEZER.

SIZES AND PRICES.

10 quarts	$15·00		
15 "	$20·00.	With Fly Wheel,	25·00
25 "	25·00.	" "	30·00
35 "			40·00

COG WHEEL FREEZER.

SIZES AND PRICES.

2 quarts	$3·50	8 quarts	$ 9·00
3 "	4·50	10 "	12·00
4 "	5·50	15 "	15·00
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Solid Cast Steel Augers & Reamers

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All sizes in stock. **Socket Shanks, Ring Handles, and Connecting Rods** for the above to order. Also **Tenoning Tools** for oining log ends.

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Iron Foundry, Machine & Sheet Iron Works,

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Inventor, Patentee and Manufacturer of the Celebrated Self-dumping Hoisting Tubs, Iron, Coal Cars, side or bottom dumping, Iron Dock and Hook Blocks, Iron Sheaves, with or without Steel Friction Rollers for Chain, Wire or Hemp Rope, of every size and description. Iron Box Wheelbarrows, Coal and Coke Barrows, Charging Scoops, etc., for Gas Works, and Sheet Iron Work in general. Improved Mast Shoe and Gaft Socket Castings, and complete Iron Work for Mast and Gaft made to order and put up if desired. Machinery, Building and other Castings on hand and made to order. Illustrated Circular and Price List sent on application.

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Keep constantly on hand

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Also, all kinds of Wood Turning, File Handles, Cotton Hook Handles, Druggists' Boxes,. All work turned out by the Waymouth Improved Patent Variety Wood Turning Lathes.

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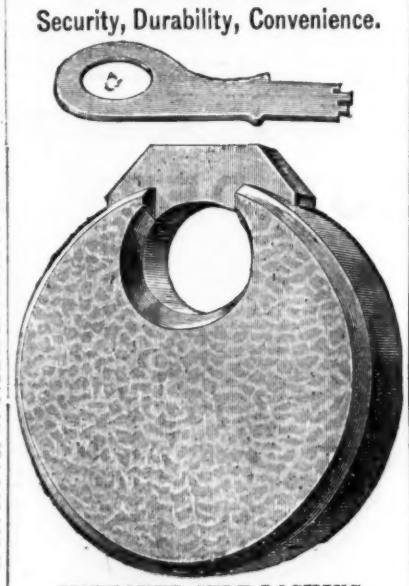
Security, Durability, Convenience.



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Made in the most substantial and compact manner, and are in every respect a superior article. We guarantee that no two locks are alike, unless specially ordered. Each lock furnished with two keys. Any number of locks or keys made to order. Adopted by the United States Government. Samples of No. 1 Lock sent to all parts free, on receipt of $1·50. **Liberal Discounts to the Trade.**

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POCASSAT IRON WORKS, Established 1824.

Southern Hollow Ware,	Bar, Band & Hoop Iron,
Enameled & Stove Ware.	Railroad Supplies,
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Steam, Blast, Vacuum and Hydraulic Gauges, Engine Counters, Pyrometers, Buss Patent Governor, Steam Reducing Valves, etc. Sole Depot,

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Moore's Pat. Triple Acting

RATCHETS, DRILLS & WRENCHES.

Good as the Best. Cheap as the Cheapest.

Price $5·00 to $12·00.

Foster's Combination BELT TOOL.

IMPROVED HAND VISE,

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Send for lists and discounts to

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Winne & Campbell, Chicago.
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Jackson & Tyler, Baltimore
Chas. Churchill & Co., London, Eng.

Manufacturers' Agents, or to

Lowell Wrench Co.,

Worcester, Mass.

Wooden Money.—Advocates of inconvertible paper currency may perhaps derive some satisfaction and encouragement from the fact that from the reign of Henry I. down to the period of the establishment of the Bank of England, the legal tender money of England was fabricated out of wood. This instrument was called an exchange tally, and by virtue of it the holder was entitled to receive from the Crown the value inscribed thereon. It really consisted of one-half of a four sided rod or staff, on which, when in its entire state, the sum it purported to represent was carved in transverse notches, varying in width for thousands, hundreds, scores, pounds, shillings and pence. These signs were for the unlearned; for the advantage of those who could read, the sum was written in ink on two opposite sides of the staff, and, finally, with a knife and mallet the staff itself was split in two, longitudinally. One-half, called the tally or check, was given to the person for whose service it was intended; the other half, called the counter tally, was laid up in safe keeping until its corresponding tally should be brought in by the person who had last given value for it. Its intrinsic value was, of course, only that of the wood of which it was composed, but by representation it denoted large sums. It was a current token of real money, and served actually to distribute it from man to man by exchange. From this primitive tally was derived the Exchequer Bill, first introduced in 1696 by Mr. Montague, then Chancellor of the Exchequer. The word "Bill," too, was no doubt obtained from the Norman-French word, *bille*, which means a staff. Bank post bills and bills of exchange in our own day came from the same wooden base, and soldiers are said at this hour to be "billeted," because formerly they tendered wooden "billes" or tallies to the victuallers upon whom they were quartered. In olden time officers of the army when taken into the king's own pay, were said to be put on the *staff*, that is, they were paid with exchequer tallies, or wooden money. Staff officers are even now occasionally said to be of a rather wooden (headed) type, but this does not tally with our theories, however it may be, practically, true.

Milton Bradley, the well-known manufacturer of Springfield, has a scheme in mind for furnishing boys and young men a chance to learn a trade which sounds quite practicable. He thinks that if he fitted up the top story of his manufacturing block on Harrison avenue with 40 or 50 small work benches and various carpentering machines with power, he could find quite a number of youth who would be glad to pay a small rent for these benches, with the privilege of working there at any time during work hours under the supervision and with the advice of some competent overseer. After a short time they would doubtless be able to make numerous articles that would bring them back a part or the whole of their rental. The boys could not only learn how to do joiner work, but would get a smattering and learn the practical application of mechanical drawing, and those that were inclined might make a beginning at designing and wood engraving, which would doubtless strike the fancy of boys who have printing presses of their own. Mr. Bradley has suitable men to take charge of the undertaking. He has frequently had boys in his establishment, and knows how much they can learn in the directions mentioned with such supervision as this plan would afford. They might, if necessary, carry this on outside of attendance at regular day schools, and many men might also like an opportunity for such relaxation as work at the bench affords. The matter of expense is the chief obstacle, and that ought not to be insurmountable. If 40 boys can be found who are ready to pay about $1 a week or $50 a year, the enterprise could be pushed through. Now that the system of apprenticeship is obsolete, some such plan as this seems to offer the best substitute for parents who wish their sons to keep out of mischief and learn the use of tools, or for charitable persons who wish to give needy youth, Miss Bascom's graduates for instance, the means of supporting themselves. It is to meet a public want that Mr. Bradley has devised the plan, and he is now seeking the views of those informed in such matters before putting his plan in motion.

EXCELSIOR LAWN MOWER.

Prices Reduced for 1876.

IT HAS THE LARGEST SALE OF ANY LAWN MOWER IN THE WORLD.

It has been adopted and can be seen in practical operation on **Central Park** and all the other **City Parks, New York; Government Grounds** and **City Parks, Washington; Boston Common, Boston; Prospect Park, Brooklyn;** and on almost every prominent Park throughout the **United States and Canada.** Four sizes for hand-power; four sizes for horse-power.

Prices from $14 to $200. EVERY MACHINE WARRANTED.

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CHADBORN & COLDWELL MFG. CO.,

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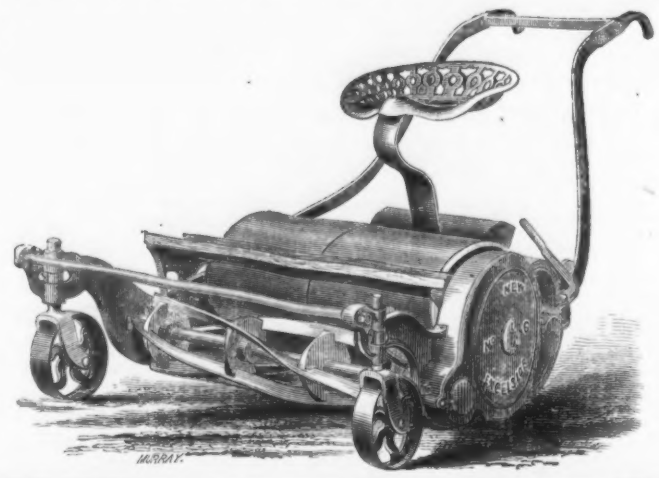
The Great Trial.

At the trial held in New York city, on the 25th of June, 1874, the **New Excelsior** was awarded the First Premium (a Silver Medal) by the American Institute, in competition with all the different Lawn Mowers now made in this country.

The New Jersey State Agricultural Society, at its Annual Fair, in September, 1874, awarded the **New Excelsior** the highest honor and the First Premium (a Silver Medal) after a full and fair test of its merits as compared with three other of the principal Lawn Mowers now in use.

This Proves THE EXCELSIOR the best Lawn Mower in the World.



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PASSENGER CAR LOCKS,

Bronzed, Nickel-Plated and Japanned.

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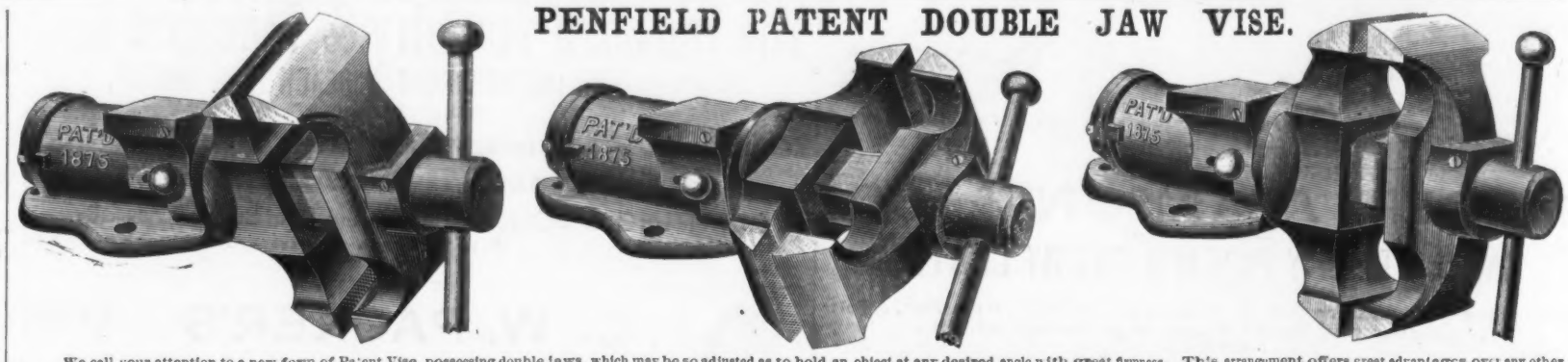
PENFIELD PATENT DOUBLE JAW VISE.



We call your attention to a new form of Patent Vise, possessing double jaws, which may be so adjusted as to hold an object at any desired angle with great firmness. This arrangement offers great advantages over any other Vise, as the operator can place his work at any angle best suited to his convenience. On the standard there is a spring bolt, which, when it is desired to adjust the jaws, is drawn back, and the jaws are set at any desired position. The face of one pair of jaws are roughened, and those of the other pair are smooth, to suit different kinds of work. The whole construction of the Vise is such as to prevent any chips or filings entering the working parts. Into the end of the standard is placed the flange nut, which is held in its position at the rear end of the standard by two steel screws holding it firmly in its place. ☞ Send for Circular and Price List.

Manufactured by **ELMORE PENFIELD, Middletown, Conn.**

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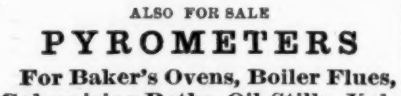
for BLAST FURNACES.

E. BROWN'S STANDARD PORTABLE,

E. Brown's Improved

Gauntlet



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E. Brown's Portable Blast Gauge for the plug hole, Steam Gauges, Blast Gauges, Mercury Gauges, Recording Steam Gauges, Engine Counters, Indicators for ascertaining the Horse Power.

ALSO,

REVOLUTION INDICATORS.

The Revolution Indicator is driven like a governor, either from a horizontal or vertical shaft; it constantly indicates, without the use of a watch, the number of turns per minute made by a Steam Engine.

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Circulars on application.

The undersigned is the Sole manufacturer of **Brass Wheel Dating Stamps,** under the Robertson patent, also on hand large assortment of Numbering Machines, Bank, Office and Railroad Stamps, and Printing Ribbons of all sizes and Colors. Send for circulars.

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MANUFACTURERS OF

BUILDERS' HARDWARE.

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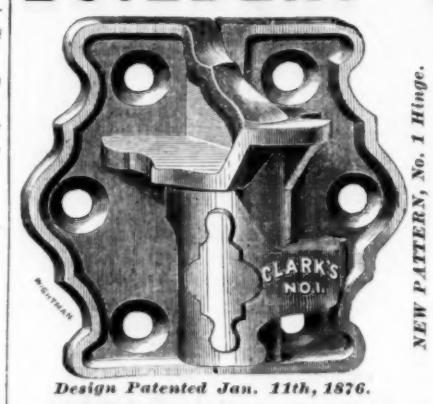
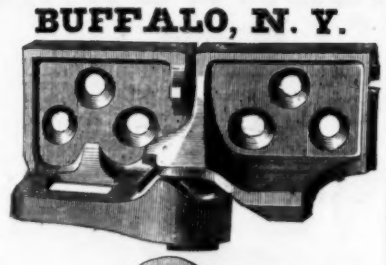
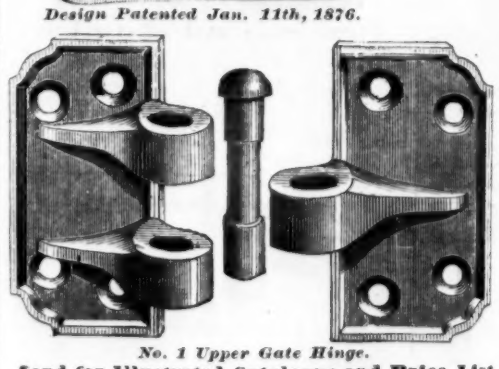


Design Patented Jan. 11th, 1876.

NEW PATTERN, No. 1 Hinge.





No. 1 Upper Gate Hinge.

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Middleboro' Shovel Co.,

MANUFACTURERS OF

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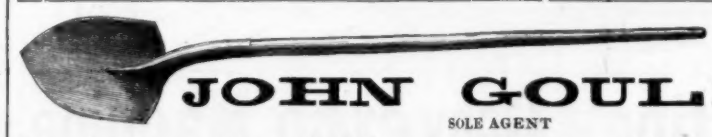
J. CLARK WILSON & CO., New York Agents, 81 Beekman Street.



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Birmingham Shovel Co. and American Shovel Co.,

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New Patents.

We take the following abstract of new patents, recently issued, from the official record:

LEADER PIPE.

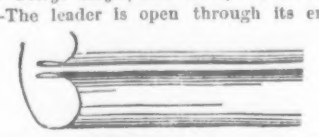
To George Hayes, New York, N. Y.—Feb. 22.—The perforations have flaps or burrs on

their interior, so that water may flow in a downward direction without wasting, but the pipe cannot become charged by stoppage, thus avoiding the effect of frost.

A leader pipe having perforated or punctured openings running in a vertical direction, and having bars or flaps on the inside.

[LEADER PIPE.

To George Hayes, New York, N. Y.—Feb. 22.—The leader is open through its entire

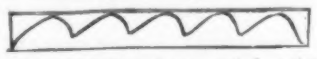


length, and is thereby made expansible to obviate injury from frost. The re-entrant curves prevent the escape of the water.

A leader pipe of a round, oval, or square form, having its edges bent inward reversely, and having an opening the entire length.

METALLIC SHUTTER.

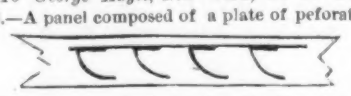
To George Hayes, New York, N. Y.—Feb. 22.—A metallic plate or panel in one piece,



perforated in bands and corrugated or stepped in the manner described.

METALLIC SHUTTER.

To George Hayes, New York, N. Y.—Feb. 22.—A panel composed of a plate of peforated



metal or wire cloth having blank strips of metal or other suitable material bent into the form of a ledge, secured and distributed over its outward surface.

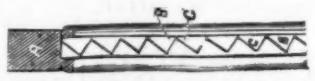
PANEL FOR BLINDS.

To George Hayes, New York, N. Y.—Feb. 22.—A panel composed of strips of metal, each

strip having perforated and blank portions bent into the desired form.

PANEL FOR BLINDS.

To George Hayes, New York, N. Y.—Feb. 22.—A panel composed of strips of perfor-



ated metal and blank strips of metal bent into form.

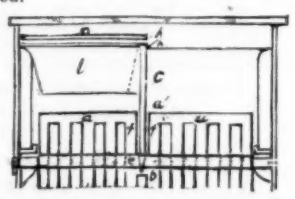
ATTACHMENT FOR COOKING STOVES.

To Edwin B. Patten, Bangor, Me.—Feb. 22.—The slot in the rear of the grate permits it to be dumped without interfering with the division plate.

1. The combination of a partition dividing the fire box of a stove with a slotted grate provided with a slot, *a'*.

2. The combination of a grate, *a*, having a slot, *a'*, and a cross bar, *b*, as shown, and partition *c*, having lugs *e e* projecting downward on each side of said cross bar.

3. The combination of a slotted grate, *a*, operating as set forth, and dividing partition *c*, with a draft stopper sufficiently raised above the surface of said grate to permit it to be dumped.

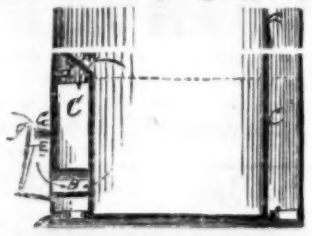


4. The combination of a slotted grate, *a*, and partition *c*, with a draft stopper, *i*, unattached to said partition, and provided with a flange, *k*, or lugs *j*, to keep it in position on the surface of the grate when the same is dumped.

5. In combination with a partition, *c*, and pan *l*, provided with grate *m*, the cover *o*, operating as a draft stopper.

STOVE.

To David L. Stiles, Rochester, N. Y.—Feb. 22.—The flue cap is inclined and arranged to prevent entrance of sparks, &c., to descending front flue. The draft opening is covered by a



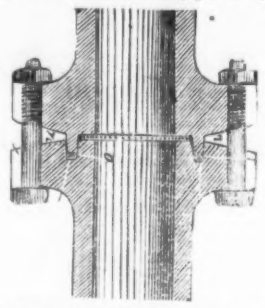
door hinged at bottom, and capable of being locked in any desired position.

1. In a cylinder or other shaped stove, the flue plate constructed with the central trunk C, curved sides *b b*, and inclines *m f*, with the ports or passages for the entrance of the draft, housed or covered to prevent the entrance of ashes.

2. The combination, with the draft opening or tube E, of the exterior casing or jacket G and the swinging door *g*, capable of removal or turning back for the removal of coals.

JOINT FOR GAS, WATER AND STEAM PIPES.

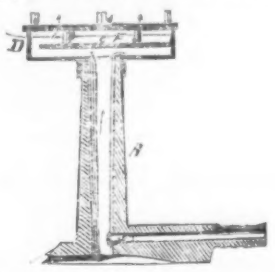
To Wm. H. Vick, Rochester, N. Y.—Feb. 22.—The tongue and groove are shaped to prevent the cold lead packing from being cut and pressed outward. A pipe coupling, consisting of the beveled groove I and tongue *n*, formed on the abutting ends of the pipes A A, for the



secure holding of the packing ring *o*, said pipes being provided with the slotted flanges B, for the ready insertion and removal of the bolts.

GAS STOVE.

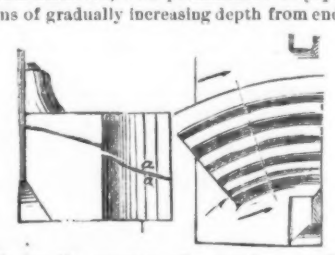
To Duane N. Gleason and Albert A. Bowler, Brooklyn, N. Y.—Feb. 22.—In combination



with the upright tube A, having cup D with projections *c*, the perforated plate E, having spaced disk F.

MANUFACTURE OF SHEET METAL MOLDING.

To Fred. Hoeltge, Cincinnati, Ohio.—Feb. 22.—1. A pair of dies constructed substantially as herein described, with prominences or depressions of gradually increasing depth from end to



end, for the purpose of operating on sheet metal by successive blows, in the manner explained.

2. The process, substantially as herein described, for producing arched or curved moldings by successive strokes with dies formed with prominences or depressions of gradually increasing depth.

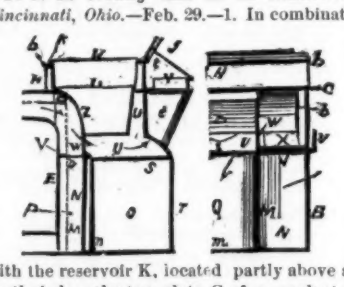
COOKING STOVE.

To Wm. P. Abendroth, Port Chester, N. Y.—Feb. 22.—The flanged pipe is detachably fastened to either hole.

A cooking stove or range provided with two pipe holes, one of which may be used as a boiler hole, in combination with an interchangeable cover and a flanged collar for the pipe, adapted to fit in either hole.

RESERVOIR COOKING STOVE.

To J. B. Crowley and A. E. Chamberlain, Cincinnati, Ohio.—Feb. 29.—1. In combination



with the reservoir K, located partly above and partly below the top plate C of a cook stove, we claim the box H, flues P P' Q *q*, passages X X, chamber U, exit Y, and extended flue strips M M', the latter being curved, respectively, at *m m'*, to fit the concave front Z of said reservoir.

2. We claim the flanges *b b'* and wings W W', when located as described, so as to form, in conjunction with the reservoir K, the rear upper portions of diving flues P P', when the dampers V V' are elevated.

3. In combination with the reservoir K of a cook stove, we claim the flues P P' Q *q*, passages X X, chamber U, and extended flue strips M N, the latter being curved, respectively, at *m m'*.

4. We claim the central ascending flue Q, formed, as described, by the combination of the concave front Z of the reservoir, flue strips M N, plates E and *q*, in combination with flue U and exit pipe T, placed behind the reservoir.

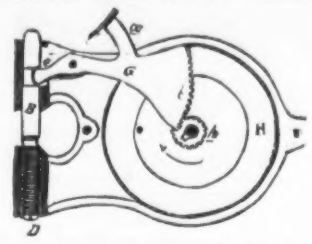
GAUGES.

To Thomas S. Disston, Philadelphia, Pa.—Feb. 29.—1. The combination, in a gauging instrument, of an adjustable screw or pin D, a sliding pin B, a spring tending to maintain the same in contact with the said adjustable pin D, and a graduated plate or plates, geared to and arranged to move simultaneously with the said sliding pin.

2. The combination of the pin B, the lever G, its arm *w*, and toothed segment *f*, with the pinion *h*, connected to the graduated plate or plates.

3. The differential pinion on the graduated plate or plates, in combination with the toothed segment on the operating lever G, connected to the pin B.

4. The combination of the two sides A A'

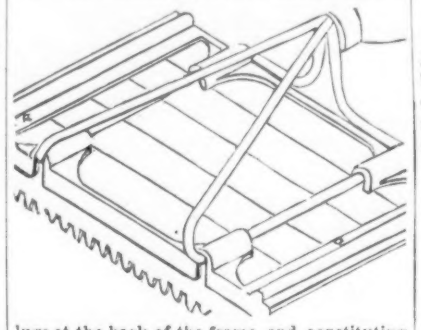


of the casing with the graduated disk I, dished and graduated plate H and coiled spring J.

CURRY COMB.

To Thos. J. Walsh, New York, N. Y.—Feb. 29.—1. A curry comb provided with a side handle and with lugs at the back, to which the handle is connected through the medium of a frame or rods.

2. The continuous wire rod passing through



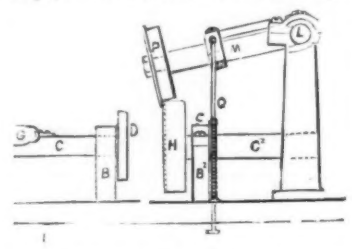
lugs at the back of the frame, and constituting the supplementary handle.

3. The combination of the toothed bars, the rods connecting the bars and side handle, and a plate or plates bent or cast to form loops, by which the rods are connected to the bars.

4. The back pieces, having their bearings against the ends of the comb bars, and confined thereto by the frame or rods *g*.

SEAMING MACHINE.

To E. Hine, New York, and G. W. Bentley, Brooklyn, N. Y.—Feb. 29.—1. In a machine for

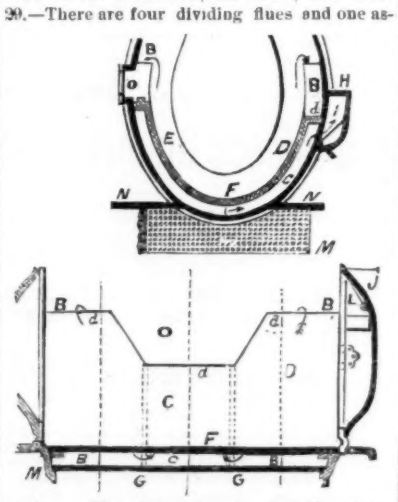


seaming metal cans the combination of a hollow disc, H, supported upon a revolving shaft, C², a flanged roller, P, supported by a rock shaft, M, and a suitable frame, A, for supporting the same.

2. In a machine for seaming metal cans, the combination of a hollowed disc, H, supported upon a revolving shaft, C², a flanged roller, P, supported by a rock shaft, M, a disc, D, supported by the shaft C, and a frame A.

HEATING STOVE.

To C. H. Blanchard, St. Louis, Mo.—Feb. 29.—There are four dividing flues and one as-



cending. The depression in the side plates affords space for window. The shoulders on the body of the stove rest on the base.

1. The combination of the stove A, plates D and E, flanges *d d d* and *e e e*, and strips G G, forming the four diving flues B B B B, and the exit flue C.

2. The combination of the plates D E, depressions O O, and the flanges *d d d* and *e e e*.

3. The combination of the plates D and F and the strips G G.

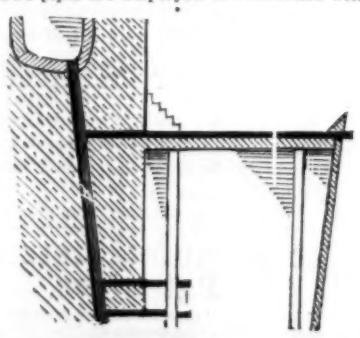
4. The combination of the plate D, depression O, flanges *d d d*, and the strips G G.

5. The stove A, plate E, depression O, and window P combined.

6. The combination of the stove A, base M, hearths *n n n*, and heads L L, provided with the shoulders *l l l l*.

HOUSE VENTILATION.

To B. Abrahams, New York, N. Y.—Feb. 29.—Two pipes are employed in connection with



the sewer, extending from the sewer to the roof of the building, and arranged so that the gases discharged from the sewer through the one will be replaced by air entering the sewer through the other.

The method herein described of ventilating house sewers, and also the sewer in the street, and providing for the discharge of gases generated or entering therein by the employment, in connection with the house sewer or service pipe, of two pipes extending from the sewer pipe to or above the roof of the building, and

arranged so that the gases discharged from the sewer through the one will be replaced by air entering the sewer through the other.

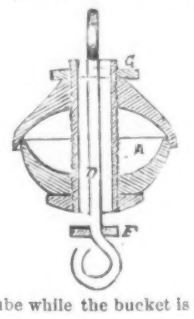
MICA LIGHT FOR STOVES.

To John W. Elliott, Toronto, Canada.—Feb. 29.—1. A mica light for stoves, having the handle plate C at the upper end thereof.

2. A mica light, having perforation D and strengthening tip C, in combination with the lip *b* of the window frame.

CHAIN PUMP BUCKET.

To John A. Churchill, Council Bluffs, Iowa.—Feb. 29.—Two half globes of rubber, the under one being the smaller. Their concave surfaces facing, are held together by disks screwed on a tube, through which passes a rod carrying a valve at its lower end that



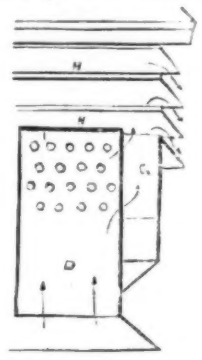
closes the tube while the bucket is passing upward.

1. A pump bucket composed of two half globes or balls, one being larger in diameter than the other.

2. The hollow shaft or tube A, in combination with the rubber bucket and the rod D, with its valve F.

VENTILATOR FOR CHIMNEYS.

To L. A. Heard, Cleveland, Ohio.—Feb. 29.—The perforated cylinder D, annular chamber G,



having an inclined base provided with openings *d*, in combination with the deflectors H and conical cap I.

EAVES TROUGH.

To W. F. Moulton, Burlington, Vt.—Feb. 29.—A wooden eaves trough made thicker in the center than at the edges, and connected by flanged iron pieces.

1. The wooden trough A formed with a true outside circle, its edges *x x* rounded or molded,

and an increased swell from the edges to the center.

2. The coupling C formed tapering from the center toward both ends, and provided with flanges *a a* along its edges.

3. The coupling E G provided with the coupling flange attached to the part E, and made tapering from the angle toward both ends.

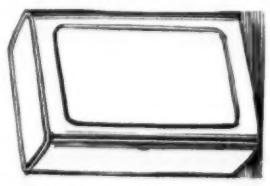
4. The flanged head H, in combination with the wooden trough A.

NOZZLE FOR OIL AND OTHER CANS.

To Frederick W. Wiesebrock, Brooklyn, N. Y.—Feb. 29.—In a nozzle for oil or other cans, the hollow stem A, provided with screw threads *a*, holes *a' a'*, and groove or air vent *c*, valve seat B, and plate F, with or without the plate F'.

SHEET METAL CAN.

To Wm. A. Wicks, Baltimore, Md.—Feb. 29.

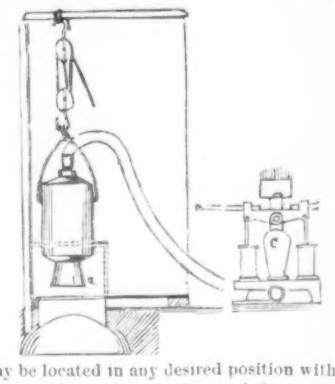


—A sheet metal can having the continuous flanged ends and rounded corners.

APPARATUS FOR CLEANING PRIVIES.—REISSUED.

To Henry C. Bull, Brooklyn, N. Y.—Feb. 29.—The cask is connected to the night soil (when lowered into the vault) by a tubular funnel attached to its lower end. Cask is connected to the pump (on which the deodorizer is rigidly mounted) by a flexible tube. Pump produces in cask a vacuum, which is occupied by the night soil, which closes the air outlet by forcing up a floating valve, whereupon connections of cask are removed and its ends closed by screw caps. Gases forced by pump through deodorizer.

1. A privy vault cleaning apparatus consisting of an air pump, a deodorizer, and suitable tubular connections, in combination with an independently movable receiving cask, having an induction passage or opening, and also an air opening for connection with the air pump, and provided with screw necks at each opening, for receiving sealing caps or covers, substantially as described, whereby the movable cask



may be located in any desired position with relation to the vault and privy, and the pump and deodorizer located in any desired position with relation to the vault, privy, and cask, and also whereby the casks, when filled, may be handled as is usual with filled casks.

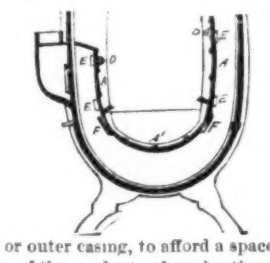
2. The combination, with a portable cask, having a conduction aperture at one end, of a check valve, a screw neck surrounding the aperture, a funnel shaped pipe connected with the neck, and an air eduction passage provided with a screw neck.

3. The combination, with a portable night soil cask, of a float valve located at the air passage, substantially as described, whereby the fluid matter is prevented from entering the air passage and clogging the suction air pipe and pump.

HEATING STOVE.—REISSUED.

To Chauncey H. Castle, Quincy, Ill.—Feb. 29.—The lining plates, which, together with the stove barrel, form the revertible smoke flue, are removably secured, so that they may be adjusted or removed without displacing other parts of the stove.

1. The plates A, provided with the flanges F and F', in combination with a stove having apertures of a suitable size to permit the removal of the plates, and provided with the ears E and C, and the plates held in position by the bolts B.



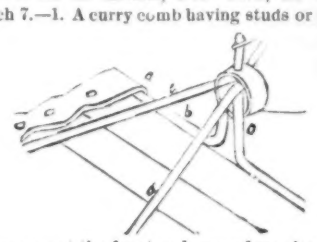
barrel or outer casing, to afford a space for the passage of the products of combustion between said lining and barrel, the said lining being capable of insertion into or removal from the stove without displacing any other portion of the stove.

3 1. An improvement in Todd stoves, consisting of a bottom plate separated from and combined with the stove barrel to afford a space for the passage of the products of combustion between the plate and barrel, said plate being capable of insertion or removal, without displacing any other portion of the stove except the side lining plate or plates.

4. An improvement in Todd stoves, consisting of a lining plate or plates separated from and combined with the stove barrel to afford a passage for the products of combustion between the plate and barrel, and having a removable attachment operating against the lining plate, which plate can be inserted or removed without displacing any other part of the stove except the removable attachment.

CURRY COMB.

To C. E. L. Holmes, New York, N. Y.—March 7.—1. A curry comb having studs or pro-



jections *a a* at the front and rear edges, for the attachment of rods leading to the handle.

2. The combination, in a curry comb, of toothed bars and knocker plates, having at the ends hollow studs or eyes, arranged transversely, or thereabout, for the reception of the rods *b b'*.

3. A curry comb provided with a side handle, C, hung to the comb so as to be turned down upon the latter.

4. The combination of the comb, the bars *b*, jointed to the comb, and the adjustable handle, provided with appliances for connecting it to the bars *b*.

5. The combination of the curry comb, the handle C, and bars or rods extending from the handle, and terminating and connected to the comb at the front and rear edges.

6. The spring connections extending from the handle or tang to the back of the comb, and constituting a yielding support for the hand.

The following trade-marks, bearing date Feb. 22, was duly registered in the Patent Office:

3441.—*Steam Boilers and Steam Engines.*—Porter & Co., Syracuse, N. Y. Application filed December 18, 1875. "word 'Economizer.'"

3435.—*Stoves.*—Greer & King, Dayton, Ohio. Application filed February 5, 1876. "word 'Chester.'"

Scientific and Technical Notes.

M. Carre, whose name is well-known in connection with ice making machinery has produced

A FAMILY ICE MACHINE,

which promises to be useful. The essential parts of the apparatus consist of an air pump, capable of producing a good vacuum, a horizontal cylindrical receiver, partially filled with sulphuric acid, and the carafe or flask, in which the water is frozen, and which is connected with the receiver (and consequently with the pump) by a suitable pipe, or tube, provided with necessary stop-cock. The carafe is suspended from the tube by means of an India-rubber ring, which insures an air-tight joint between it and the receiver. The operation of the apparatus is as follows: The carafe, an ordinary flask with elongated neck and swelled body, is half filled with water and suspended from the table before mentioned by means of the rubber ring or cork. In order to insure the perfect tightness of the joint between the flask and the tube, upon which the success of the operation of freezing is largely dependent, the stop-cock upon the tube is closed, a small quantity of water is poured between the cork and rim of the glass (to render any subsequent leakage visible), a few strokes of the pump are made to exhaust partially the acid receiver, and the stop-cock is turned on. The effect of this preliminary manipulation is to attach firmly the flask to the tube by atmospheric pressure and insure a perfectly air-tight joint. The pump is now worked rapidly for a few minutes, when the water in the flask begins to evaporate rapidly and at last bursts into violent ebullition. The vapor evolved is drawn through the receiver containing the acid, which at once absorbs and condenses it. Very soon a few filaments of ice will be observed to form in the water, and the pumping is to be continued for a few minutes longer, after which a stop-cock connecting the pump with the receiver is closed and the flask left on the tube. In fifteen or twenty minutes afterward the water will be found to be frozen throughout. The flask can then be removed and another substituted, and if the stop-cock between the flask and receiver were closed previously to the removal of flask No. 1, the vacuum in the receiver will have been preserved, and much of the preliminary pumping may be dispensed with in the case of flask No. 2. The theory of this operation is the same as that of the familiar lecture room experiment of freezing water by its own evaporation. In the case of M. Carre's device, the rapid evaporation of the water effected with the pump by relief of pressure is materially aided by powerful absorptive qualities of the sulphuric acid in the receiver, and in order to insure better contact of the acid and vapor, an ingenious apparatus called the agitator is provided by the inventor which stirs up the acid during the motion of the pump. This agitator consists of a rocker furnished with paddles, and extending the length of the receiver, the motion of the rocker being obtained by means of a lever attached to the pump handle. The apparatus is carefully constructed so as to avoid the entrance of acid either into the flask or the pump, so that the employment of the acid need afford no inconvenience to the introduction of the machine in private houses. The acid may be removed and replenished when necessary by means of a suitable opening provided on one end of the receiver. When the acid is fresh, the freezing operation is much more rapid than when a number of carafes have been frozen, a natural consequence of the weakening of the acid by dilution from the absorbed vapor. When the efficiency of the acid has become notably impaired, it must be removed and replaced by fresh material. The cost of freezing a single carafe is estimated to average about one-half to two-thirds of a cent where the acid is thrown away after its work is performed; where the diluted acid can be utilized this estimate will of course be materially lessened. The carafe, or decanter, half filled with ice, is to be completely filled with water, and is thus brought upon the table, being replenished with fresh water when empty. The shape of the decanter renders the melting a slow process, and when once partially filled with ice it will supply cold water for the greater part of the day. If desired, however, it is obvious that the same machine, with a suitable modification of the water vessels, can be made to furnish ice blocks of any size or form.

Prof. V. Wartha communicates to Dingler's *Journal* an account of

AN UNUSUAL CASE OF BOILER EROSION,

which came under his notice. In a certain manufactory in Upper Hungary, it was noticed that the feed water heaters of the boilers began to leak in a short time after the factory went into operation. The leak grew worse, so that it was soon necessary to replace the feed water heaters, although almost new. It was then found that the boiler plates, which were 7 millimeters (0·27 inches) thick, and made of fibrous iron, were perforated in spots, while other spots were eaten in to a depth of 4 millimeters (0·15 inches), but otherwise the interior walls of the warmer were intact and covered with a scarcely perceptible film of carbonate of lime. A piece of the boiler plate was given to Wartha for examination. The corroded spots were filled with a brown, greasy substance, which he examined more carefully. The mass consisted for the greater part of oxide of iron, then a considerable quantity of fatty matter, some carbon and mineral matter, as they appear in every boiler incrustation. The fatty substance was examined, as he was convinced at the outset that therein lay the key to the solution of the whole problem. Treated with ether, a dark brown greasy substance was dissolved, which remained when the ether was evaporated as a greasy brown mass, insoluble in water, and was recognized as oleate of the oxide of iron. By saponification with barita the presence of oleic acid was proved. No glycerine was found, hence no neutral fat was present. A synthetical experiment was then made with free oleic acid, which acquired a yellow color by long standing in the air. A few cubic centimeters of this fatty acid was mixed with water and iron filings, and, on heating, hydrogen gas was violently given off, while there was produced a brown, sticky compound of the fatty acid and oxide of iron, soluble in ether, and containing 11 per cent. of oxide of iron. In short, it differed in no respect from the substance found in the feed water heater. The explanation of the phenomenon sketched above is now very simple. In the factory referred to, the exhaust steam (*retourdampf*) was used to heat the water in the warmer, whereby free oleic acid, produced by the decomposition of oil by steam and pressure in the steam cylinder, was carried along into the feed water heaters. Here the condensed drops of oleic acid hang as a sticky mass on the walls of the boiler, and assisted by the pressure, attack the iron first at the point of contact, but the compound of oleic acid and iron becomes diffused throughout the whole of the oily drops, and the warm water coming into contact with it under pressure, breaks it up again into oxide of iron and free oleic acid, so the acid is again liberated and dissolves a fresh quantity of iron, and the drops penetrate deeper and deeper into the sides of the boiler. After a short time the plate is eaten through and the boiler leaks. This explains how a relatively small quantity of oleic acid is able to bore through a plate of boiler iron 7 millimeters thick.

According to *L'Institut* the

SPECTROSCOPIC DETERMINATION OF PHOSPHORUS IN PIG IRON

is a comparatively simple process. When an electric spark passes between two iron electrodes in the air, and the spark is examined by the spectroscope, the phosphorus spectrum will appear if the iron contain a trace of phosphorus. If the spark, however, be made to pass in a tube from which the air may be exhausted, or replaced by hydrogen, the phosphorus lines of the iron spectrum disappear. As soon as oxygen is readmitted the phosphorus lines reappear, and the amount of oxygen necessary to cause their reappearance is inversely proportional to the quantity of phosphorus in the iron. Alleyne has determined experimentally the laws governing it, and constructed a table which shows at a glance the amount of phosphorus corresponding to any given volume of oxygen employed. These tables, as well as the apparatus employed, are given on page 253 of *L'Institut*, 1875.

The material employed in the

MANUFACTURE OF UCHATIUS STEEL

in Sweden is granulated pig iron and the best Bissberger roasted ore finely stamped. The crucibles hold about 25 kilos of steel, and usually last for six fusions of 3½ hours duration. With No. 6 steel, which contains from 0·30 to 0·45 per cent. of carbon, the fusion lasts for 7 or 8 hours, and a crucible can only be used for one such fusion. The consumption of fuel is 4·2 hectoliters for 50 kilos of steel. The steel is numbered as follows:

No.	Per cent. carbon.	Uses.
3	0·70 to 0·85	
2	0·85 to 0·95	Tools for working stone.
1	0·95 to 1·10	Cutting tools, coining stamps.
01	1·10 to 1·20	" " " "
02	1·20 to 1·30	Razors.

Vlandeeren has made

ANALYSES OF BANCA TIN,

from different districts with the following results:

Name of District.	Iron.	Sulphur.
Djeboes	0·0087	0·0099
Blinjoe	0·0175	0·0030
Soengeiliat	0·0060	0·0040
Pangkalpinang	0·0060	0·0027
Merawang	0·0070	0·0090
Soengeislan	0·0196	0·0029

No arsenic could be detected in it; traces of lead were found in Djeboes tin only. There were traces of carbon in all the samples.

The *Dresdener Anzeiger* says of

WATER METERS:

In Germany there are no less than 140 different kinds of water meters which have been tested, all of which registered large quantities well enough, but were unfit for private houses, as they could not be relied upon for small quantities. Hager, an inventor, who lives in Stettin, has, however, solved not only this but another important problem. Hager left the water running through his meter, and dropping from the spigot so slowly that only 10 liters run out in 7 hours. The water ran into a 10 liter vessel, and as soon as this vessel was full, the index correctly marked 10 liters. The other apparatus, which the same journal states has been invented by Hager, is an automatic attachment applied to wash bowls, sinks and bath tubs, so arranged that when the water is left running it is shut off as soon as the water reaches a certain hight, near the top of the basin, thus preventing, not only the waste of water, but the damage frequently done when pipes are frozen or choked up, or the water is supplied faster than the waste pipe can carry it off.

Special Notices.

BRASS GOODS.

Having bought the

"Detroit Novelty Works"

we are desirous of renting for a term of years the Brass Shops therein, consisting of **Molding Room**, 35x43 feet, with three melting furnaces and large coke oven; **Finishing Room**, 38x95 feet, with 11 lathes and all appliances for finishing goods in the best manner. Any required power can be supplied. Everything is in good order and ready for immediate work. Both rooms heated by steam. To the right parties we will sell the **Patterns** of a full line Steam, Gas and Water Goods at a low price, with ample time.

For an enterprising man or men this is a grand opportunity for engaging in a paying business. The locality is unexcelled as a distributing point. Labor cheap and abundant. We are now operating our Iron Foundry and Machine Shop, so that a full line of cast iron fittings can be made on the premises. Apply to

DETROIT IRON & BRASS MFG. CO.,
Detroit, Mich.

AFTER SEVERAL YEARS OF SUCCESSFUL experience in the construction of

New and Experimental Machinery,

we desire to invite the attention of manufacturers, and others wanting that class of work, to our facilities at Peekskill, N. Y., near the Hudson River Railroad depot, 1h. 20m. from N. Y. City.

ANDERSON BROTHERS.

Hardware Stock Wanted

In exchange for Texas frontier lands, good situations, located in 1874, or Mo. legal lands.

GRAY, BOWMAN & CO., St. Louis, Mo.

Special Notices.

WANTED TO EXCHANGE

at cash prices, real estate for 30 to 35 lb. T Railroad Iron, new, or first-class second-hand. Sufficient to lay 10 miles of track. Address,

P. Y. HITE, Tarentum,
Allegheny Co., Pa.

THE Centennial Card

Parties who intend to exhibit at the Centennial, should use the

Indestructible Mirror Card

The Handsomest and most attractive medium for introducing goods known. They will never be laid aside. Send for price to

W. F. HYATT,
Successor to **HICKOX MFG. CO.,**
280 Pearl Street, NEW YORK.

$20,000.

Wanted a party with this amount to take an interest in a manufacturing business of Staple Goods. Factory and tools complete. Money wanted for working capital. A liberal arrangement will be made with the right party, either as special or general partner. Business can be worked up to $100,000 per annum with good profit.

Address, *HARDWARE, Box 12,*
Office of *The Iron Age*, 10 Warren St, N. Y.

WANTED a situation as superintendent of some Engine and Boiler or other Mechanical Manufactory, by a thoroughly competent and business man. Experienced in managing help and designing and drafting all kinds of machinery. Best references offered. Address, **B.,**
4 Spring Street, Utica, N. Y.

WANTED situation as foreman in a mechanical establishment, by a man 28 years of age. Is a college graduate, has served a three years' apprenticeship at machinists' trade, and for past two years has been assistant draughtsman in water works construction. References as to ability and character. Address, **F. M. C.,** P. O. Box 268, Rochester, N. Y.

Hardware Business For Sale.

One of two stores, one at Watertown, Mass., in care of my son, one in the city of Newton, Mass. Either store is well established and remarkably well situated for trade, having been established some 18 or 20 years, and under my own care. The growth of this trade is sufficient recommendation for any party wishing to establish themselves in trade.

Apply to *Alfred Howes*, Newton, Mass.
Or *George E. Howes*, Watertown, Mass.

CENTENNIAL EXHIBITION.—The undersigned, a German, having been engaged by Messrs. Siemens Brothers, of London, England, the great Cable Manufacturers, to represent their interests at the coming Centennial Exposition—which will occupy but a small portion of his time—would be pleased to arrange with some other firms to represent their interests at the same time for this occasion. Terms reasonable. Refers to Messrs. W. B. Bement & Son, of Philadelphia, where he was formerly engaged. Please address

R. BORCHERS, Mech. Engineer,
656 N. 12th st., Philadelphia.

CENTENNIAL EXHIBITION.

A young man, a native of this city, with good references, having had large experience in the Hardware Trade, offers his services in receiving, arranging and keeping goods in order during the exhibition. Terms moderate. Address,

JOSEPH K. PARKER,
461 North 2nd Street, Philadelphia.

VENTILATING & STEAM HEATING.

A thoroughly competent engineer, with extensive experience in the above line, desires employment.

Address **M.,**
Office of *The Iron Age*, 10 Warren St., N. Y.

Business Opportunities.

New Capital Procured, Partnerships Arranged, and Commercial, Mining and Banking Corporations Organized, by

CLARKE, CHITTY & CLARKE,
Board of Trade Offices, New York.
P. O. BOX, 4071.

A. PURVES & SON,
Corner South & Penn Streets, Phila.,
Dealers in
Scrap Iron & Metals, Machinery, Tools, Shafting & Pulleys, Steam Engines, Pumps & Boilers, Copper, Brass, Tin, Babbit Metals, Foundry Facings. Best Quality Ingot Brass.
Cash paid for all kinds of **Metals** and **Tools.**

HARDWARE SPECIALTIES

Manufactured to order on favorable terms.
POWER AND ROOM to Rent by the
CORRUGATED METAL CO., East Berlin, Ct

JUST ISSUED.

EVERYTHING FOR THE FARM. Seeds, Implements, Machinery, and Fertilizers. New Catalogue, 300 Illustrations, mailed on receipt 10 cent stamp.

A. B. COHU,
197 Water St., N. Y.

Wanted,

some manufacturer to buy the patent of the

IMPROVED SMOOTHING IRON

described and illustrated in the January 1, 1876, issue of the *Scientific American*, in the whole or in parts. Address

R. H. HASENRITTER, Herman, Mo.

Partner Wanted,

In large Iron Property. Charcoal Furnace and Forge Works leased for $12,000 per annum, quarterly payments. Room for other works. Make best quality metal. Address

P. O. Box 863, Baltimore, Md.

To Manufacturers and Patentees.

Wanted useful patented articles for manufacture, suitable for sale by hardware dealers. Cash will be paid for patents or advance made for royalty.

Address, **P. P. PRATT,**
Care **PRATT & CO., Buffalo, N. Y.**

Special Notices.

OTIS T. BEDELL'S
Patent Rapid Transit Screw Wrench.

New, strongest, best. Is one-third stronger (weight and material being equal) than any screw wrench in market. Is instantaneously adjustable, operates very easy, will not spring in the back, will not bind on the screw, no back pressure on the handle, very durable, costs no more than others. The American and Foreign Patents for sale or to lease on royalty of less than one per cent. Address

OTIS T. BEDELL, 83 Reade St., N. Y.
Care ELY & WRAY. ☞ See cut—Vol. 17, No. 12, p. 9.

SPECIAL NOTICE.

Having established ourselves in business in this city for the sale of

American Hardware, House Furnishing Goods, Agricultural Implements, etc.,

we beg to solicit correspondence with parties desirous of being represented by us in Germany and surrounding countries.

HAMMACHER & DELIUS.

HAMBURG, Germany, April, 1876.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,

IRON AND STEEL,
Care of *P. O. Box 813, Bridgeport, Conn.*

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO, Proprietors,
101 & 103 Duane St., N. Y.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1865, and July 3, 1866. **There is a special claim on each of the Dies.** All persons infringing on said patents will be held responsible to the extent of the law. **Russell Jennings.**
DEEP RIVER, Conn., Sept. 7, 1874.

WANTED TO PURCHASE,
100 tons good Second-Hand T Rails, 18 or 20 lbs. per yard.

Address, giving particulars,

PIPER & THOMPSON,
Lapeer, Mich.

TO LET,
A Light, Handsome Office.
Possession Immediately.

HERMANN BOKER & CO.,
101 Duane Street. N. Y.

MANUFACTURERS

desirous of introducing their goods to the **British** and **Continental** Markets, are advised to insert advertisements in the newspaper **"IRON,"** published every Saturday, at *99 Cannon Street, London, E. C.*

SCALE: First 3 lines, 3/; every additional line, 10d. Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

HALL & HARBESON,
Manufacturers of
Chemical & Physical Instruments,
191 Greenwich Street, N. Y.

SPECIALTY.—BUNSEN'S GAS BURNERS, for all heating purposes; BUNSEN'S IMPROVED GAS COMBUSTION FURNACES, with 10, 15 and 25 burners. Fine Brass and Metal Work made to order for Metallurgists, Chemists, Experimenters, Colleges, &c.

Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 25 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to

CHESTER STEEL CASTINGS CO.,
Evelina St., Philadelphia, Pa.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy.

A practical man with means is wanted to join a practical man who is already well established.

Address *CAR WHEEL FOUNDRY,*
P. O. Box 134, Selma, Alabama.

Briesen's Patent Agency

FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE,
No. 258 Broadway, New York.
A. V. BRIESEN.

NOTICE! POND'S TOOLS.

The undersigned has assumed the Personal Property, including accounts, finished and unfinished Machinery, good will &c., connected with the manufacture of MACHINIST'S TOOLS as conducted by Mr. Lucius W. Pond since 1847, and will continue the said business at the old stand, cor. Union and Exchange Sts., Worcester, Mass., under the name of DAVID W. POND, Successor to Lucius W. Pond.

CARD.—Having assumed the business mentioned above, I solicit Inquiry and Patronage, with guarantee that present standard of Workmanship, and quality of Machinery shall be maintained. A large quantity of NEW AND SECOND-HAND TOOLS, ALL STYLES AND SIZES, For Sale at Low Prices. Send for list of second-hand tools Store at 98 Liberty St., New York, will be discontinued from Feb. 1, 1876, and all sales made from manufactory.

Respectfully, **DAVID W. POND,**
Successor to LUCIUS W. POND.

DISSOLUTION OF COPARTNERSHIP

The firm of McClernan & Hymes is this day dissolved by mutual consent. The business of the firm will be liquidated by M. McClernan alone, No. 130 Liberty Street.

M. McCLERNAN,
NEW YORK, Jan. 20, 1876. D. HYMES.

DISCOUNT LISTS.

Hinges { Stanley Works' 1st...10 % to 50 % each, 75c.
and Butts, { Union Mfg Co.'s.....10 % to 60 % " 75c.

Bolt, File and Hinge and Butt List.—Contains all the lists and discounts that are used.....Price $1 50

Dayton & Lamberson, 97 Chambers St., N. Y

Special Notices.

Important to Manufacturers.

BISSELL, WELLES & MILLET,
Auctioneers and Commission Merchants, No. 15 Murray St., New York,

Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large lines of goods are unsurpassed. Advances made if desired.

Worcester Free Institute.
APPRENTICE CLASS,
Enter January 29. Address,
Prof. C. O. THOMPSON,
Worcester, Mass.

For Sale.

A **BLAST FURNACE FOR SALE** at Napanoch, Ulster Co., State of New York, on the Delaware and Hudson Canal, with extra facilities, and a capacity of 20 tons per day Anthracite or 15 tons of Charcoal, together with a splendid water-power, goes with the furnace. The furnace is in good order and could be put in blast in a short time. Will be sold very low on accommodating terms. Charcoal can be had for many years.

Address, **H. BANGE,**
94 Gold Street, New York City.

FOR SALE, at Taunton, Mass.

The Steam Engine Works known as the Foundry and Machine Co., consisting of all the Real Estate, Machinery, Tools and Patterns necessary for building Corliss Steam Engines, from 10 inch to 34 inch cylinder; also a full stock of Tools and Machinery for general job work. This property will be sold extremely low, either for the Machinery, Tools and Patterns to be removed, or the entire property. The city of Taunton offers superior advantages as a location for any kind of machine business, having a navagable river for receiving coal and iron. Two lines of railroad connected by steamers between New York and Boston; superior Western connection by railroad, and a large and intelligent manufacturing population. For further particulars or catalogue of machinery address

GEORGE A. FIELD,
Taunton, Mass.
Or *J. M. LEONARD, Somerset, Mass.*

STEAM ENGINES FOR SALE.

I offer the following very superior TODD & RAFFERTY Engines for sale, at greatly reduced prices, if disposed of before the 1st of May, to save removal, viz.:
One 18x36, one 14x18 (saw mill), one 13x18, one 11x24 one 10x14, one 9x20, one 7x6, one 5x10 (on legs), one 8x12, portable, one 8x16, double housting. All first-class and entirely new. Also various sizes and kinds of Boilers. I will also furnish specifications and estimates for all kinds of Rope and Bagging Machinery. Send for descriptive circular and price. Address, **J. C. TODD,**
10 Barclay St., N. Y., or Paterson, N. J.

COPPER ROLLING MILL FOR SALE.

I offer for sale the Rolling Mill of the Houghton Copper Works, situated at Houghton, L. S., Mich.; and about 2 acres of land on which it is located, the machinery, tools, appurtenances and dock connected therewith. Also all the corporate rights and franchises of the company, and good will and trade already established. For price, terms of sale or other information, address, **M. VAN ORDEN,** Agent,
Houghton Copper Works,
Houghton, L. S., Mich.

FOR SALE.

TESTING MACHINE, built by the Southa Boston Iron Co., arranged for tensile and compressive strains, capacity 150 tons.
MILLING MACHINE, built by Brainard Milling Machine Co., cutters swing 28 inches diameter, and spindle set at right angles, which insures accurate work
IRON ROOF, that covered New England Iron Co.'s Mill, 8 arches 80 feet span, posts 18 feet high, building now 80 feet wide by 90 feet long.
ROLLING TABLE, for straightening Iron.
PUDDLE TRAIN, for Billets and 3, 4 and 6 inch Bars.
FIVE DRILLS.
CORRUGATING MACHINE, Complete.
CORRUGATED SHEET IRON and barbed Nails.
SMALL UPRIGHT ENGINE, 15 H. P., 8 inch cylinder.
PUMPS, Etc.

Apply to **WM. E. COFFIN & CO.,**
8 Oliver Street, Boston.

HARDWARE STORE, FOR SALE.

Is one of two stores situated in a city of seven thousand inhabitants, three railroads, fine country surrounding. Best of reasons for selling. For further information, address, **KING & SON,**
Lima, Allen Co., Ohio.

BLACK WALNUT
For Sale Cheap.

Large quantities of pieces of plank suitable for turning and sawing into any article requiring such wood.

Perfectly Dry and Sound.

PROVIDENCE TOOL CO.,
Providence, R. I.

FOR SALE.

At Lowest Manufacturers' Rates,
GUNS & SHEET ZINC,
Best German and Belgian Brands,
By *LOUIS WINDMULLER & ROELKER,*
20 Reade Street, N. Y.

HARDWARE BUSINESS For Sale.

In the city of Norwich, Conn., an old stand facing two streets. Rents low. Good help and doing a prosperous business. Large back country. The best of reasons given for selling. Address,

FULLER & PARISH, Norwich, Conn.

FOR SALE.

An ¾ inch mill train for making Merchant, Band and Hoop Iron. Will be sold cheap.

Apply to **W. W. JONES,**
Near the Lehigh Valley Railroad Depot,
Allentown, Pa.

FOR SALE,

at 10c. a copy, Weekly Spanish Review and Prices Current. The undersigned is also a *Translator* from and into the English, Spanish, French and German. *Latest Translations made:* for the governments of Germany and Spain, Pacific Mail S. S. Co., Walter A. Wood; Morris, Wheeler & Co.; Todd & Rafferty; John T. Dunkin; Fisk & Hatch; R. W. Wilde; Wilson Sewing Machine Co.; J. Hess & Co.; H. Marquardt; M. Echeverria & Co., and Chas. E. Little, New York; Hocking Valley Mfg. Co.; W. P. Potts, Son & Co., Phila.; Atlantic and Pacific Land Co.; B. E. Flemming, Jersey City; Wilder & Co., Savannah, and the Tanite Co.; Stroudsburg ("Emery Grinder"), Abendroth & Root Mfg. Co., to whom he refers.

☞ **Estimates furnished of translations and setting up of Spanish, German and French Catalogues for the Centennial.**

C. KIRCHHOFF,
Metal Reporter of "The Iron Age,"
Box 3091, New York P. O.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, April 12, 1876.

The past week has been so very dull in Wall street that there is but little material out of which to make a report of general interest. Money has ruled somewhat higher than last week, with 4 @ 5 per cent. as the rate to borrowers on call. Mercantile paper is quoted at 5 @ 6 per cent, with comparatively little offered.

The fact that the Ways and Means Committee, by a majority of one (six to five) have agreed to report the Morrison tariff bill to the House was the principal topic of discussion in business and financial circles.

It is not believed by well informed persons that the bill will pass the House, or that it will be possible to harmonize the various amendments which will be offered by the members in the interest of their respective constituencies. Should it pass the House it will, in all probability, be mutilated beyond recognition by Senate amendments, in which it is not probable the House will concur. Among party leaders on both sides there is a well founded disinclination to make any radical changes in the tariff policy of the government on the eve of a Presidential election. The action of the Ways and Means Committee is commonly looked upon as an effort to make a show of business, but it is well known that they took up a ready made bill, and it is generally believed that its important provisions have received only very superficial consideration. There is not one chance in a thousand that the bill can be pushed through this session, and if it goes over with the unfinished business it will not probably be heard of again.

The gold market has been alternately weak and strong, but the fluctuations of the premium have been within narrow limits. The following table shows the daily range of the premium since our last report:

	Highest.	Lowest.
Thursday	113	112⅛
Friday	113⅛	112⅛
Saturday	113⅛	113
Monday	113⅛	113
Tuesday	113	112⅞
Wednesday	113¼	113

Government bonds are active and strong. Investment shares of all kinds are steady, but railway mortgages are quiet. We give below the closing quotations of Governments.

The stock market has been brisk, with a downward tendency. The principal dealings were in Western Union, Lake Shore, Erie, Pacific Mail, St. Paul and Northwestern. We give below the quotations of active shares at the close of business to-day.

The following tables show the movements in foreign trade since our last report:

IMPORTS.

For the week ended April 8:

	1874.	1875.	1876.
Total for week	$11,278,078	$8,878,316	$7,369,522
Prev. reported	110,396,414	97,997,981	87,245,385
Since Jan. 1	$121,674,492	$106,876,297	$94,614,907

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Anvils	90	$888
Brass goods	16	3,304
Bronzes	7	1,052
Chains and anchors	17	1,169
Copper		7,786
Cutlery	77	23,204
Guns	18	4,153
Hardware	22	1,476
Iron, pig, tons	596	12,490
Iron, sheet, tons	4	473
Iron, other, tons	197	12,745
Iron, ore, tons	250	492
Lead, pigs	2,000	11,870
Metal goods	154	14,268
Nails	100	2,764
Needles	6	6,176
Old metal		837
Per. caps	10	1,404
Saddlery	12	1,891
Steel	1,228	16,512
Silverware	4	146
Tin, boxes	11,536	76,522
Wire	219	5,201
Zinc	60,558	3,963

EXPORTS OF SPECIE.

For the week ended April 11:

Total for the week	$48,190
Previously reported	1,399,458
Total since Jan. 1, 1876	$1,447,648
Same time in 1875	5,064,248
Same time in 1874	1,188,066
Same time in 1873	1,055,531
Same time in 1872	578,316

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended April 11:

	1874.	1875.	1876.
Total for week	$5,199,462	$4,151,369	$4,523,403
Prev. reported	73,705,006	62,601,149	62,872,249
Since Jan. 1	$78,904,468	$66,752,418	$67,395,652

Government bonds close as follows:

	Bid.	Asked.
U. S. Currency 6s	126	126½
U. S. 6s 1881, reg	121⅜	121⅝
U. S. 6s, 1881, cou	122⅛	122⅜
U. S. 5-20 1865, reg	114⅝	115
U. S. 5-20 1865, cou	118	118¼
U. S. 5-20 1865, cou	118	118¼
U. S. 5-20 1865, new reg	119¼	119⅜
U. S. 5-20 1865, con	119¼	119⅜
U. S. 5-20 1867, reg	121¼	121⅜
U. S. 5-20 1867, cou	121⅛	121⅜
U. S. 5-20 1868, reg	123¼	123½
U. S. 5-20 1868, cou	123⅜	123½
U. S. 10-40 reg	117⅛	117⅜
U. S. 10-40 cou	118⅛	118⅜
U. S. 5s, 1881, reg	117¾	118
U. S. 5s, 1881, cou	118¼	118⅜

The following were the prices of active shares at the close of business to-day:

	Bid.	Asked.
Atlantic & Pacific R. R. Preferred	3¼	4
Atlantic and Pacific Telegraph	18	18¼
Chicago & Northwestern	42	42¼
" " Pref	62	62½
Chicago, Rock Island and Pacific	105	105⅛
Chic., Bur. & Quincy	119	120
Col., Chic. & Ind. Cent	4¼	4⅜
Clev., Col., Cin. & Ind's	54	55
Cleveland and Pittsburgh	96	96⅛
Chicago & Alton	102¼	103⅛
" " Pref	110	112
Consolidation Coal	43	43¼
Canton	38	40
Del. Lack. and Western	115	115¼
Delaware & Hudson Canal	115¼	116
Adams Express	107	108
American Express	60¼	61
United States Express	71¾	72¼
Wells, Fargo & Co. Express	87	87¼
Erie	18¼	18¾
Harlem	138	139
Hannibal & St. Joseph	17	17⅛
" " Pref	25⅝	26
Illinois Central	98	99
Kansas Pacific	9¾	11
Kansas & Texas	11½	12
Lake Shore	58⅜	58¾
Michigan Central	59	59¼
Morris & Essex	105⅝	105¾
Milwaukee & St. Paul	41⅛	41½
" Pref	66¾	67
Mariposa	7⅛	11
" Pref	7⅛	12
New York Central	112⅜	112¼
New Jersey Central	100⅜	101
Ohio & Mississippi	17⅝	17⅞
Pacific Mail	18⅜	18½
Panama	127	130
Pittsburgh & Fort Wayne	102¾	104
Pacific of Missouri	14⅜	14¾
Quicksilver	17	17¾
" Pref	22¾	23
St. L., Kan. City Northern	5¾	6¼
" " Pref	29¾	30¼
Tol., Wabash & Western	3	3⅛
Union Pacific	64¼	64½
Western Union Telegraph	66⅝	66¾

GENERAL HARDWARE.

There is very little to notice regarding the condition of the Hardware market, which is much the same as previously reported. No changes in values have been reported since our last writing.

The manufacturers of Cordage held a meeting in this city to day, at which existing prices were confirmed. We also hear of a meeting of the manufacturers of Cast Butts, in New Haven, Conn., but up to the hour of going to press no particulars have reached us.

The Boston Rolling Mills have added to their production the manufacture of Machine-Made Horse Shoes, which they quote at $5 per keg of 100 pounds.

The Hart, Bliven & Mead Mfg. Co. and Branford Lock Works shipped their samples, weighing about 7 tons, to the Centennial Exhibition, at Philadelphia, on the 7th inst. These two companies will exhibit together, and will occupy a space in the main building 7 feet wide and 56 feet long, with avenues 10 feet in width around the whole structure, showing their goods on all sides. They will exhibit a full line of their manufactures.

The demand for Nails is fair, and prices are firm at our quotations. The action of the Western Nail Manufacturers Association, at their meeting, in Pittsburgh, on the 6th instant, has had a strengthening effect on prices, and orders for future delivery at current rates could not be placed. On another page we print particulars of the action taken at the meeting. We quote, as before, 10d., in lots of 100 kegs and over, $2·75, net; small lots are quoted $2·80 @ $2·85, according to quantity and brand.

The following circular explains itself:

OFFICE OF ENTERPRISE MANUFACTURING CO. OF PA. PHILADELPHIA, April 1, 1876.

GENTLEMEN: For the convenience of the Trade, we have established an Office and Sample Room at No. 113 Chambers street, New York, where we will keep a well-assorted stock of goods of our manufacture. Messrs. Graham & Haines will act as our agents in soliciting and receiving orders and delivering of goods, which will be invoiced in our name and charged on our books by them.

Parties making their purchases in whole or in part from them will be entitled to, and will receive, the same prices and terms as from us.

We are constantly adding new and meritorious articles to our list of goods, and with greatly increased facilities are prepared to fill, at the shortest notice, all orders with which we may be favored.

Thanking you for past favors, and hoping this arrangement will result in an increase of your patronage, we are,

Very truly, yours,
ENTERPRISE MF'G CO. OF PA.

Branch Offices: 113 Chambers street and 95 Reade street, New York.
GRAHAM & HAINES, Agents.

We have received the following:

To the Trade: I have now ready a new article of manufacture, to be used in connection with my Upper Window Spring, which consists of a burnished silvered Bushing, to be put in the recess in which the thumb-piece works. The bushings are packed in paper boxes containing one dozen each, with label on lid giving full instructions for attaching. Samples of Bushings and Springs mailed free to the trade.
W. S. HAMMOND, Lewisberry, Pa.
April 3, 1876.

H. M. Reed & Co., Erie, Pa., manufacturers of the Erie Lawn Mower, quote these goods as follows: 14 inch cut, $20; 16-inch cut, $25 each, less 30 per cent. discount. Every part of this Mower is duplicate and interchangeable, and the parts being few there is little danger of them getting out of repair. The gearing is enclosed and protected from dust and grass, and the revolving cutter is so constructed that it is impossible for grass to wind around the shaft; the cut is adjustible. Only the two sizes mentioned above are made. The company inform us that their present orders for these Mowers are double what they were last year at this time. An illustration of these goods will be found in their advertisment on the 10th page.

Geo. H. Gray & Danforth, Boston, have issued a pamphlet of nearly fifty pages, descriptive of the Wellington Mills, London, Emery, the origin of the trade mark, etc. The book contains an interesting biographical sketch of the Duke of Wellington; a list of local sale agencies; a number of testimonials from manufacturers regarding the superior cutting qualities of this brand of Emery, and a good deal of general information on the subject. Parties wishing a copy of the pamphlet can have it mailed to them by addressing Geo. H. Gray & Danforth, No. 48 India street, Boston, Mass.

G. B. Walbridge & Co., No. 99 Chambers street, invite the attention of manufacturers to an assortment of machinery, all in good order, which they offer for sale. A list of the various machines will be found in their advertisement on the thirty-first page.

D. K. Chase, of the firm of Chase, Barker & Co., Hardware and Iron merchants, Calais, Me., died on the 1st instant, aged 61 years. He was born in Lyndon, Vt., and was a resident of Calais, Me., for the past forty years, and for thirty years was favorably known to the Hardware trade of New York and New England. He served in both branches of the State Legislature, and was Mayor of Calais for the years 1859, 1860 and 1861. He accumulated considerable wealth, and in his will made provision for the endowment of a public charity, to be known as the "Chase Poor Fund."

BRITISH IRON MARKET.

(*Specially reported by cable for The Iron Age.*)

WEDNESDAY, April 12, 1876.

Scotch Pig.—There is very little business doing, and prices for makers' Irons are purely nominal and irregular; no quotations can be given.

Manufactured Iron and **Rails** are without change to note.

IRON.

American Pig.—The market continues without change, except that there is talk among some of the Lehigh companies of a combination to control prices, and, perhaps, limit consumption, which, however, is at present very small, only a third of the furnaces on the river being in blast. The demand continues small, and sales are nearly entirely confined to small parcels to meet the immediate wants of consumers. Some of the companies are still quoting $23, but we do not believe any considerable sales have been made at more than $22. The Thomas Iron Company report sales aggregating 1100 tons No. 1 and 2 Foundry at $22 and $20 respectively. We quote No. 1 Foundry, $22 @ $23; No. 2 Foundry, $20 @ $21; Gray Forge, $19 to $20.

Scotch.—Prices are maintained tolerably well, all arrivals going into consumption, while stocks in yard are held at prices which prevent any considerable sales. Any large importations of Scotch Iron would depress the price very much if forced on the market. Two hundred tons of Eglinton have been sold for export to St. John's at a private price. We quote: Coltness, $32·50; Glengarnock, $30; Gartsherrie, $31·50; Eglinton, $28·50 @ $29.

Rails.—Quotations remain as before, and we only hear of small transactions at private prices.

Old Rails.—As there have not been any recent sales to establish prices, we refrain from quoting.

Scrap.—We quote $30 @ $31, without sales of note.

METALS.

Copper.—The market for Lake Superior Copper on the spot has been quiet, sales being restricted to 250,000 pounds at 22⅝c. @ 22¾c. We quote Baltimore, nominally, 22¾c; Lake 22¾c. @ 23c. Manufacturers have at length come forward and secured 5,000,000 pounds futures Lake Copper, deliverable from June to August next, at 21c. The knowledge of these extensive engagements ahead has imparted more tone to the entire market, inasmuch as producers of the raw material have that much out of the way, and will be able to manage the incoming quantities in June with all the greater ease. It will, of course, very much depend on the developments of trade in the brass regions during the summer months, but even supposing that there be some disappointment under this head, we are fully aware, on the other hand, that the consumers of Copper in general carry but limited stocks, and that in any event they will, by degrees, all appear in the market as purchasers between the opening of Lake navigation and fall. At the same time, the paying of 21c. for June to August delivery proves that those manufacturers who now anticipate wants look forward to an even, unexcited market in the future, and that, at all events, they have no apprehensions of any extraordinary drop in values. These views of theirs are fully in accordance with those prevailing in Europe, where Chili Bars, instead of continually fluctuating, as they are wont to do, have been slowly appreciating, while Best Selected, a non-speculative Copper, has been receding from the lack of an active momentary demand for consumption. The future there is well thought of, but current requirements are the reverse of pressing. By cable Chili Bars are quoted £77·10/, and Best Selected has declined to £83·10/. New Sheathing is firm at 31c., and Bolts and Braziers, 32c.; Bronze and Yellow Metal Sheathing, 21c.; and Yellow Metal Bolts, 28c., cash.

Tin.—Straits at London has declined to £72, as per cable, while Singapore remains at $21·25. One of the London East India firms expresses itself on the subject of the then impending Dutch sale as follows, under date 23d ultimo: "The effect of the Dutch holding their Banca at 50 guilders will be to throw all the demand into this market, to increase our deliveries, work down our stock, and to let the large stock be kept in Holland, where it is likely to be more steadily held than by scores of importers here. Thus for the present the market will be steadied, and subsequently the policy of the Dutch Company will become of an important and incalculable influence." On the 30th ult. the same house writes as follows: "We can see no ground for expecting a sudden rise, but we believe Tin is cheap enough at £70 @ £75 for the consumption to gain on the production, though perhaps slowly. All reports of the low prices at which it pays to raise Tin ought, we think, to be received with great caution, for they refer naturally to the richest mines in the most favored situations, and, of course, it is not such mines that are most affected by low prices. These tell on the poorer mines, and it is by a decrease in their production that the total supply is ultimately reduced. From the Straits the export to England this month will be 500 tons." Drawing a conclusion from well weighed reflections of impartial, experienced men like the writer of what precedes, we are led to think that there are more elements of strength in the future of Tin than there have been in the past. We have been remarkably quiet here, and quote, in gold, for large lines: Straits, 16½c. @ 16¾c.; English Refined, 17¼c.; ditto Common, 16¾c.; and Banca, 21½c. Tin Plates, both here and in England, have also remained quiescent at the following gold rates per box, large lots, ordinary brands: Charcoal Bright, $7·12½ @ $7·37½; ditto Ternes, $6·75; Coke Tin, $6·25; and ditto Ternes, $6.

Lead—Remains in a position of extreme listlessness, with little prospect of a speedy amelioration in this respect, due altogether to the stagnation in the building and plumbing trades. A small jobbing business has been the consequence, sales in trifling lots not summing up more than 50 tons. We quote common Domestic, 6·35c. @ 6·45c., gold; a larger lot, if thrown upon the market to-day, would in all likelihood not bring over 6·30c., gold. The government offers its Lead at 6·35c., gold, equal to 6·40c., gold, in this city. In Foreign no sales are reported. In Europe matters begin to assume a more cheerful aspect. The great floods have subsided, and the spring trade, with its usually large Lead demand, was opening at last dates, a little backward, it is true, but more promising, stocks having been worked off considerably, causing a slow but steady improvement in desirable sorts. We quote: Bar, 9c.; Sheet, 9½c., and Pipe, 10c.; discount to the trade 10 per cent.

Spelter and Zinc.—At the advanced rate of 8c., currency, less 1 per cent. for Western Spelter, little has as yet been done, there being sundry dealers who purchased at former prices, but too anxious sellers at somewhat below the enhanced figure. Of foreign 25 tons W. H. sold at 7·30c., gold; nothing has transpired in futures. A party seems to have been offering Silesian Spelter through the public prints at ¼c. @ ⅝c., gold, per pound, below the cost of importation, soliciting orders for it in currency, which no regular importer would be likely to do, where the commission he earns is but 1 per cent. Good Silesian Spelter would cost about 7·20c., gold, to import, and adding thereto the gold premium of 13 per cent., this would amount to 8·14c., currency, whereas the party alluded to has offered it at 7⅝c., currency. If these facts, which have been mentioned to us, are precisely as here stated, the whole thing would look very much like an attempt to affect the combination price of Domestic.

Sheet Zinc is steady at 8½c. @ 8⅝c., gold.

Antimony continues to be firmly held at 16¼c. @ 16½c., gold.

IMPORTATIONS.

Of Hardware, Iron, Steel and Metals into the Port of New York, for the week ending April 11, 1876:

Hardware.

Boker Hermann & Co.
Mdse. pkgs., 4
Curley J. & Bros.
Mdse. pkgs., 1
Cohn & Hecker,
Ironware, cs., 6
Cross & Beguelin,
Files, cks., 3
Field Alfred & Co.
Packages, 7
Chains, cks., 5
Frasse P. A. & Co.
Wire, cks., 1
Friedmann & Lauterjung,
Mdse. pkgs., 3
Fuller Bros.
Anvils, 59
Harmar Wm. & Co.
Packages, 3
Kittson N. W.
Shot, bags, 160
Lau & Garlichs,
Mdse. pkgs., 2
Laughland & Co.
Wire, pkgs., 29
Wire, crates, 1;
bdls., 21; coils, 18
Mason John W. & Co.
Wire, coils, 4
Moore's J. P. Sons,
Gun caps, cs., 12
Neymann E. H.
Wire netting, rolls, 45
Patrick R. & Co.
Cases, 1
Piersons & Co.
Wire, coils, 206
Roebling J. A. & Sons,
Mdse. pkgs., 1
Sanderson Geo. & Co.
Packages, 8
Schoverling & Daly,
Mdse. pkgs., 3
Sawyer J.
Wire rope, reels, 2
Thomas Seth E.
Packages, 3
Van Wart & McCoy,
Mdse. pkgs., 3
Wiebusch & Hilger Mfg. Co.
Anvils, 170
Ward A.
Packages, 3
Mdse. pkgs., 1
Wilson D. H. & Co.
Gun caps, cs., 4
Order.
Casks, 2

Iron.

Lang W. Bailey & Co.
Plates, 6
Laughland & Co.
Haybands, bdls., 390
Marvel Wm. D.
Ore, tons, 350
Rivera J. de & Co.
Molds, second hand, bxs., 1
Order.
Pig, tons, 100
Spiegel, tons, 140

Steel.

Brown, Shipley & Co.
Bars and bundles, 489
Hugill Chas.
Mdse. pkgs., 3
Seddon R.
Cases, 17
Casks, 1
Woodford W. O.
Cases, 43
Order.
Bundles, 286
Cases, 9

Metals.

Agostine J.
Copper, bbls., 5
Bruce & Cook,
Tin plates, bxs., 2126
Byrne Joseph & Co.
Tin plates, bxs., 941
Cort N. L. & Co.
Tin plates, bxs., 1213
Darrell & Co.
Scrap, pkgs., 47
Henderson Bros.
Tin, slabs, 388
Huermann Wm.
Zinc dust, cakes, 20
Naylor & Co.
Tin plates, bxs., 3353
Phelps, Dodge & Co.
Tin plates, bxs., 15,615
Tin, ingots, 783
Rivera J. de & Co.
Precipatate of copper, cs., 68
Robbins C. & Son,
Tin plates, bxs., 10
Order.
Tin plates, bxs., 4980
Tin, ingots, 300
Tin, slabs, 1237

COAL.

Very little business has been transacted in the Coal trade during the last week, and the trade is very dull. All the collieries are at work, and coal is coming forward in good quantities, the receipts for the week figuring up a fair increase over last year. People do not, however, want Coal just now, and the inducements offered by the companies are not sufficient to induce them to buy and store coal that they cannot at present use. The amount of Coal contracted for is, in many instances, very large, yet the orders for delivery do not come in, and hence there is no more doing than though there were no contracts. The operators are eager to make up for lost time, and get forward as large a tonnage as possible. The effect of this is to make buyers wait, hoping for a break. The combination have shown themselves very powerful, and the programme laid out is a very good one, if it can be carried out, but it does not seem probable that they can regulate prices to such an extent as to prevent an actual drop from the nominal figures.

In the bituminous trade things are equally uncertain, the miners in the Cumberland region being all out on a strike owing to the reduction of ten cents per ton asked by the companies. This is the first reduction which has been asked for since the war. Prices, of course, are merely nominal, as there is no sale. There is a sufficient amount on hand, however, to fill contracts for some little time to come. Whether the companies or miners will yield is uncertain. There was a rumor that some of the companies had agreed to pay the old prices; if this is the case the contest will probably end by all the companies giving the old prices for the present. Another element which tends to unsettle the Bituminous trade is the contests now going on in regard to rates for transportion. This is a matter which will probably take no little time to settle, and the result of which is not by any means certain.

Our quotations remain as follows:

Cumberland, at Georgetown	$3·25 @ $3·75
West Virginia, at Baltimore	4·50 @ 6·00
Kittaning f. o. b., Baltimore	4·25 @ 4·35
Newburg Orrel, at "	@ 4·50
Despard, at Baltimore	@ 4·50
Broad Top, at South Amboy	@ 4·75
Morrisdale, Wigtons	@ 5·00
Cunard	@ 5·00
Consolidation Coal Co. f. o. b., Georgetown	@ 3·65
Consolidation Coal Co. f. o. b., Baltimore	@ 3·90
In barges at New York	@ 5·50

WYOMING COALS.	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Lackaw'na & Scrant'n at Hobok'n & Weehawk'n	4·60	4·70	4·80	4·90	5·50	4·70
Pittston at Newburg	4·45	4·55	4·65	4·75	5·35	4·55
Wilkesb're at Port Johnston	4·60	4·70	4·80	4·90	5·50	4·70
Plymouth	..	..	4·80	5·00	5·60	4·80
Susquehanna Coal Co. at Amboy	4·60	4·70	4·80	5·00	5·50	4·80
Kingston at Hoboken	4·60	4·70	4·80	4·90	5·50	4·70
Black Diamond at Perth Amboy	4·60	4·70	4·80	4·90	5·50	4·70
LEHIGH COALS.						
Old Company at Port Johnston	5·10	..	4·90	4·90	5·50	4·80
Old Company's Room Run at Port Johnston	5·10	..	4·90	4·90	5·50	4·80
Sugar Loaf, Hoboken and Amboy	5·10	..	4·90	4·90	5·50	4·80
Lehigh Coal Exchange at Port Johnston	5·10	..	4·90	4·90	5·50	4·80
Honey Brook Lehigh	5·10	..	4·90	4·90	5·50	4·80
Beaver Meadow at South Amboy	5·10	..	4·90	4·90	5·20	4·80

We quote below a table of freights to the principal points. It will be noted that rates are somewhat higher than they have been:

FREIGHTS—PER TON OF 2240 LBS.

PORTS.	From Elizabethport, Port Johnson, South Amboy, Hoboken & Weehawk'n.	From Philadelphia.	From Baltimore.	From Georgetown.
Augusta, Me	....	†$0·80	$1·75	....
Albany	....	....	....	....
Amesbury, Mass	....	....	....	....
Bangor, Me	$1·00	....	2·00	....
Bath, Me	1·00	....	1·50	$1·65
Baltimore	....	....	....	....
Boston, Mass	1·00	1·25@1·35	1·45	1·60
Bridgeport, Ct	·70	*·70	1·40	1·40
Bristol, R. I.	·85	....	....	....
Cambridgep't, Mass.	1·00	§1·25@1·40	....	....
Derby	....	....	....	....
Dighton	....	....	1·40	1·50
East Cambridge	§1·00	§1·25@1·40	....	....
Fall River	·85	1·25	1·40	1·40
Hackensack	....	*·70	....	....
Hallowell, Me	....	....	....	....
Hartford	....	*·70	....	....
Hoboken	·40	†·70	1·15	1·20
Hudson	....	....	1·50	1·40
Jersey City	·40	·70	1·15	1·20
Lynn, Mass	†1·10	....	....	....
Middletown	1·10	....	....	....
Mystic	....	....	....	....
Newark	....	....	1·50	....
New Bedford	·85	1·30	1·40	1·40
Newburyport	1·10	....	1·65	1·70
New Haven	·70	*·70	1·40	1·40
New London	·80	1·25	1·40	1·40
Newport	·85	1·25	....	....
New York	·40	††·70	1·25	1·30
Norwalk	·70	‡·70	1·40	....
Norwich	·90	‡1·25	1·45	....
Pawtucket	·90	‡1·75	....	....
Philadelphia	....	....	·90	....
Portland	1·00	1·30	1·45	1·60
Portsmouth, N. H.	1·10	1·30@1·40	1·60	1·70
Providence	·85	1·25	1·40	1·40
Poughkeepsie, N. Y.	....	....	....	1·40
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	1·00	....	....	....
Salem, Mass	1·00	1·25@1·35	1·60	1·60
Salisbury Pt., Mass.	....	....	....	....
Stamford	·70	*·70	....	....
Stonington	·80	....	....	....
Taunton	....	....	....	....
Troy	·65	†·80	....	....
Warren, R. I.	·85	....	....	....
Wareham	....	....	1·45	1·70
Weymouth	....	....	....	1·65
Wilmington, N. C.	....	....	....	1·25

*And discharging and towing. †And discharging. ‡And towing. §3c. per bridge extra.

OLD METALS, PAPER STOCK, &c.

The Old Metal market still continues dull and declining, and dealers are unable to obtain more than $13·50 per ton for their accumulations of Machinery Iron and $11 per ton for Stove Plate, being considerable less than that offered by consumers last week. There is a better feeling, however, in connection with Copper and Brass, which is in good demand, and quotations are more easily obtained. The Paper Stock and Rag markets have been in better demand during the week than we have noted for some time past, and, as a rule, full prices were obtained. Dealers have sold their accumulations of Soft Woolens for 7½c. @ 8c. a pound, and Woolen Tailor Clips for 13c. @ 14c. a pound. Manila Rope is without request, but quotations continue firm. Other articles present no material change. We quote the following as the current purchasing rates:

Old Metals.—Copper, 16c. @ 17c. per lb.; Yellow Metal, 11c.; Brass, 10c. @ 12c.; Composition, heavy, 13c. @ 14c.; Lead, solid, 5½c.; Tea Lead, 5c.; Zinc, 4½c. @ 4¾c.; Pewter, No. 1, 15 c.; do., No. 2, 8c. @ 10c.; Spelter, 5¾c., Wrought Iron, $27 per ton; Light do., $14 per ton; Stove Plate, $9 per ton; Machinery, do., $12 per ton.

Rags, &c.—Canvas, Linen, 4¾c. @ 5¼c.; do. Cotton, No 1, 5¾c. @ 6¼c.; No. 2, 2¾c.; White,

No. 1, 5¾c.; No. 2, 4c.; Colored, do., 2c. @ 2½c.; Mixed, Woolen, 2c. @ 3c.; Soft, do., 5c. @ 5½c.; Gunny Bagging, 1½c.; Jute Butts, 1¾c. @ 2c.; Kentucky Bagging, 3c.; Book Stock, 3c.; Waste Paper and Scraps, 1¼c.; Kentucky Bale Rope, 4c.; Oakum Junk, No. 1, 4½ @ 5c.; do. No. 2, 3c.; Tarred Shaking, 1c. @ 1¼c.; Grass Rope, 2¾c. @ 3c.

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, April 11, 1876.

PIG IRON.—Trade in this article is in a very unsettled condition; sellers appear to have lost all unity of feeling and action, and it is almost impossible to give an entirely accurate report of the market. Some respectable firms report sales during the week at $23 for No. 1 Foundry, and in some cases at higher prices, while sellers of other first-class irons admit sales at $22·50, and others again only ask $22. That the trade is thoroughly demoralized there can be no question, and that it is in a worse condition now than at any time this year cannot be doubted. The demand for Forge Irons is steady, and, with light supplies, prices are firmly maintained. We quote: No. 1 Foundry, $22 to $23; No. 2, $21 to $22; Gray Forge, $20 to $22, and Mottled, $19.

BARS.—No change in quotations; business remains dull and prices unchanged. Sales are generally at 2·35c., which is about an average quotation.

RAILS.—The inquiry is chiefly for Steel Rails, but the mills are pretty actively employed, and are not urging sales. We are reported sales at $63 75, delivered in New York, and of Iron Rails at $40 to $42 at Eastern Mills, and $42 to $44 at Western Mills. We quote Steel Rails at mills, $60 to $62, and Street Rails at $67 to $70.

OLD RAILS.—Offerings are only moderate, and the average price $22 to $23, with exceptional lots above and below these figures.

SCRAP.—No change to report. In the absence of transactions we quote as before, $16 to $19 for Cast, and $27 to $29 for Wrought.

NAILS.—The demand continues light, and holders are not anxious to push sales, as it is expected the production will be curtailed. Meantime, we quote $2·75 as the ruling price.

TIN PLATES.—Trade is very quiet, and importers not anxious to increase sales at the present low prices. We quote I. C., 10x14, $8·50 to $9; I. X., 10x14, $10·75 to $11·25; Best Charcoal, leaded, 28x20, $16·50 to $17; other good brands, $15 to $16; good fair, $14·50 to $15; Bright Tin, for cans &c., $7 to $7·25; good Bright Tin, do., $6 75 to $7·25; Coke, leaded, 14x20, $6·25 to $7.

PITTSBURGH.

PITTSBURGH, April 11, 1876.

PIG IRON.—The most noticeable feature is that a firmer feeling has been developed within the past day or two, especially as regards standard brands of Mill Iron, which are in light stock and held with considerable tenacity. It is intimated that there is an increasing inquiry, and the inference is that some of the mills are disposed to anticipate future wants. It is certain that as yet there has been no improvement in prices, but offerings are not as large as they were a few weeks ago, and if there should be a general desire manifested to buy ahead, holders will no doubt make an effort to put up prices. The combination recently formed by the Western Iron and Nail manufacturers, for the purpose of sustaining prices of the products, has had its effect in stiffening the raw article, and the future of the market depends a good deal on the success of these combinations. Foundry Iron continues very dull, with a limited consumption, considerable offering and a light demand. Coal and Coke Irons quoted as follows: No. 1 Foundry, $24 to $25, 4 mos.; No. 2 ditto, $22 to $23; Gray Forge, $21 to $22; White and Mottled, $19 to $20.

MANUFACTURED IRON.—The feeling appears to be gaining ground that the action of the Western Association in adopting a new card, which advances prices considerably, is being sustained in good faith, and the market is in better shape now for manufacturers than it has been for some time. As stocks, both in the hands of jobbers and consumers, are known to be light, an increased trade this summer is expected. Quotations may be fairly given on a basis of 2·30, 60 days, for Merchant Bars.

NAILS.—The Nail manufacturers, after a protracted season of over a week here and at Wheeling, have at length agreed upon a new card which advances prices from 30c. to 35c. per keg. The rates now are as follows: For less than 200 kegs, $2·85, 60 days with 2 per cent. off for cash; for lots, 200 kegs and over, 10c. per keg off.

HORSE SHOES are in fair demand, but unchanged. Shoenberger & Co. continue to quote at $4·50, cash, for 100 keg lots. Mule Shoes, $5 50, cash.

SCRAP.—The demand for Scrap Iron continues dull, and dealers report trade unsatisfactory; No. 1 Wrought Scrap quotable at $25 to $26, cash, delivered at mills. There is a very fair business in Scrap Steel, but it is complained that prices are low.

COKE.—Trade in this branch of business is reported very dull, and no improvement can reasonably be looked for as long as there are so many Pig Iron furnaces out of blast. Prices nominal at $2·40 to $2·50 per ton for Connellsville, delivered free on cars in Pittsburgh.

WINDOW GLASS.—There is only a moderate business, but the new card is fully maintained. Manufacturers have fully realized the fact that it is better to do one-half the business and make a little money than to work up to their full capacity and make none. Orders will, no doubt, come forward more freely within the next few weeks.

BOSTON.

APRIL 8.—The small business quoted a week ago has been lost, and the market closes dull. The lowest base price open in this market was through the canvass of the Allentown and other brands for orders stringing through any of the coming six months at $23 No. 1 X f. o. b. and $1·50 freight. A cargo Port Orem XX now delivering is credibly reported as having been bought at $19·75, f. o. b. All this would suggest that this market might yet job the best No. 1s at $25 and perhaps less, and No. 2s at $22. The bottom of the market must be somewhere, as the fact that the 26 filterers for the Standard Sugar Refinery, weighing 500 tons, to be good dry sand castings, were contracted for at 2½c. will attest. But the prices above named are not yet quoting low enough if this order is any index. *Bar* sells along at $49, with no little gossip that $47 is the proper market value, but a very careful and very general inquiry fails to make it at all certain. Sales have been made at this value, but they include some peculiar conditions that emphasize the transactions as very exceptional. The Cleveland mills have offered to fill ordinary orders at 2c., with a 30c. freight, but have taken no business. They are not low enough. Boiler Plates and rivets are selling fairly at 3c. for No. 1 Charcoal Plate, and 5¼c. to 5⅝c. for rivets. Cut Nails have settled to $2 90, without charge for keg or city delivery. The Fall River Company have placed their Boston agency with Bacon & Brown. The Rhode Island Horse Shoes have been advanced to 5 8-10c. out of store. *Steel* is having a quiet trade, something doing in machinery, and a trivial inquiry for boiler. We quote American Tool, 14c. to 15c.; American Machinery, 8½c. to 9½c.; Bessemer Tires, 5¾c.; Sweet's Excelsior Tire, 7½c.; English Tool, 15½c., gold. *Copper* shows a disposition to sustain a farther ½c. advance on the receipt of news of the heavy storms and water filling at the Lake Superior mines, and, while actual business is very much confined, quotations are nominally 23c., though 22½c. would undoubtedly buy. For manufactured we quote: New Sheathing, 30c.; Bolts and Braziers, 31c.; Yellow Metal Bolts, 20c. to 20c. *Lead* moves along in a quiet, steady way, with prices well sustained. We quote Pig, 6½c. for Domestic and 7¼c., gold, Foreign; Sheet, 10c.; Pipe, 9½c., currency; Tin Lined Pipe, 10½c.; Bar Lead, 9½c., less usual trade or 10 per cent. discount. *Antimony* continues within the combination, and quotes at 15c. gold, firm. *Spelter* has been advanced to $8, currency, for both Foreign and Domestic, New York deliveries, Boston holders asking $8·05. *Tin* is dull and easy for Pig. Plates are in better request. The London market closes dull at 73/10. We quote Straits, 16¾c. to 17c.; Banca, 22c.; Refined English, 17c., gold. We quote Plates: Charcoal I. C., $7·25; Coke, $6 to $6·50; and Terne at $6 to $7·50, gold.—*Com. Bulletin.*

CINCINNATI.

Messrs. L. R. HULL & Co., under date of April 8, write us as follows: PIG IRON.—There is no noticeable change either way since last week. Neither buyers nor sellers show much anxiety to enter the market in the way of large transactions. Prices unchanged:

CHARCOAL.

Hanging Rock No. 1..	₱ ton.	$25·00 @	—4 mos.
" " No. 2		23·00 @	—4 mos.
" " Forge		21·00 @ 22·00	—4 mos.
Southern Brands No. 1		23·00 @	—4 mos.
" Forge		21·00 @	—4 mos.
Virgin'a No. 1		24·00 @	—4 mos
" No. 2		22·00 @	—4 mos.
" Forge		21·00 @	—4 mos

STONE COAL AND COKE.

Hanging Rock No. 1...	₱ ton.	$22·00 @ 23·00—4 mos.
" " Forge		20·00 @ 21·00—4 mos.
Red Short No. 1		26·00 @ 27·00—4 mos.
" Forge		23·00 @ 24·00—4 mos.
Am. Scotch, No. 1		24·00 @ 25·00—4 mos.

COLD BLAST.

Hanging Rock Car Wheel	₱ tn.	$40·00 @ 45·00—4 mos.
Missouri " "		35·00 @ 40·00—4 mos.
Southern Br'ds " "		30·00 @ 40·00—4 mos.
Machinery and Forge		30·00 @ 35·00—4 mos.
Blooms		@ —1 mos.

ST. LOUIS.

Messrs. SPOONER & COLLINS, Iron commission agents, 409 North Third street, St. Louis, under date of April 6, report the Iron market as follows: We have but little new to report regarding the condition of our market. The demand seems to have fallen off since our last report, and several of our foundries are closing. Prices unchanged. We quote on 4 mos.:

Mo. Stone Coal, No. 1 F'dry.		$25·00 @ 26·00	—4 mos.
" " No. 2 F'dry.		24·00 @ 25·00	—4 mos.
" " Gray Mill		24·00 @ 25·00	—4 mos.
" Charcoal, No. 1 F'dry		24·00 @ 25·00	—4 mos.
" " No. 2 F'dry		23·50 @ 24·00	—4 mos.
" " Gray Mill		23·00 @ 24·00	—4 mos.
Tenn. Charcoal No. 1 F'dry		24·00 @ 25·00	—4 mos.
" " No. 2 F'dry		23·00 @ 24·00	—4 mos.
" " Gray Mill		23·00 @ 24·00	—4 mos.
Va. Coke Iron No. 1 F'dry		25·00 @ 26·00	—4 mos.
" " No. 2 F'dry		24·00 @ 25·00	—4 mos.
" " Gray Mill		23·50 @ 24·50	—4 mos.
H. R. Charcoal No. 1 F'dry		26·00 @ 27·00	—4 mos.
H. R. " No. 2 F'dry		24·00 @ 25·00	—4 mos.
H. R. " Gray Mill		24·00 @ 25·00	—4 mos.
Massillon Iron. A, No. 1		31·00 @ 32·00	—4 mos.
" " B, No. 1		29·00 @ 30·00	—4 mos.
" " No. 2		27·00 @ 28·00	—4 mos.
Cold Blast Car Wheel, Mo		35·00 @ 40·00	—4 mos.
" " Tenn.		33·00 @ 35·00	—4 mos.
" " Ala.		33·00 @ 35·00	—4 mos.
" " Hanging Rock		32·00 @ 33·00	—4 mos.
Mo. Charcoal Blooms		60·00 @ 70·00	—4 mos.
" Scrap "		55·00 @ 60·00	—4 mos.
Mo. Charcoal Hammered Billets		75·00 @ 80·00	—4 mos.
Assorted Bar Iron		@	2·35—90 dys.
No. 1 Wrought Scrap		1·10 @	1·25—cash.
Heavy Cast "		·75 @	·95—cash.
Light Cast "		·50 @	·60—cash.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of April 10, writes us as follows: Our market has shown a little more activity since last report, but without improvement in prices. On the contrary, inferior grades are offering freely at slight concessions, holders of round lots evincing a disposition to realize rather than hold longer. The usual time, 4 months, is allowed on the quotations below:

HOT BLAST CHARCOAL.

No. 1 F'dry, from Hanging Rock Ores	$25·00 @ 26·00
" 2 " " " "	23·00 @ 24·00
" 1 Mill, " " "	— @ —
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00

HOT BLAST STONE COAL AND COKE.

No. 1 F'dry, from Hanging Rock Ores	$23·00 @ 24·00
" 2 " " " "	22·00 @ 23·00
" 1 Mill, " " "	21·00 @ 22·00
" 1 F'dry, from Alabama, Georgia and Tennessee Ores	23·00 @ 24·00
" 2 F'dry, from Alabama, Georgia and Tennessee Ores	22·00 @ 23·00
" 1 Mill, from Alabama, Georgia and Tennessee Ores	21·00 @ 22·00
No. 1 F dry, from Missouri Ores	24·00 @ 25·00
" 2 " " "	24·00 @ 25·00
" 1 Mill, " " "	25·00 @ 26·00

COLD BLAST CHARCOAL.

Car Wheel from Hanging Rock Ores	35·00 @ 40·00
" " Tennessee Ores	28·00 @ 30·00
" " Alabama and Georgia Ores	28·00 @ 38·00
Car Wheel from Kentucky Ores	28·00 @ 40·00

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, Richmond, Va., writes as follows under date of April 10: Iron market without change of note. Transactions continue very light. Quotations remain as those of the past week.

Virginia cold blast Charcoal Pig Irons (according to brand)	$27 00 @ 33·00
Virginia hot blast Charcoal Pig Irons (according to brand)	24·00 @ 28·00
Va. hot blast Coke Pig Iron, No. 1 ex.	23·00 @ 24·00
" " " " No. 2 ex.	21·00 @ 22·00
" " " " No. 3 ex.	20·00 @
Virginia Anthracite. No. 1 ex	24 00 @ 25·00
" " No. 2 ex	22·00 @ 23·00
" " No. 3 ex	21·00 @ 22·00

BALTIMORE.

Messrs. WYETH & BROTHER, Iron and Steel merchants, South Charles and Lombard streets, report us the following prices under date of April 11: Business continues flat and unsatisfactory, with but little change for the better. Orders are placed cautiously and for early wants, and at figures generally shading quotations.

AMERICAN REFINED BAR IRON.

1 to 6 wide by ⅜ to 1 thick..	2 4-10 to 2 5-10c. ₱ lb.
1 to 4½ wide by 1½ to 2 thick	
Round and square, ordinary sizes, from ⅜ to 2 inclusive	2 4-10 to 2 5-10c. "
Hoop Iron, 1½ wide and upward	3¾ to 4c. "
Band Iron, from 1¾ to 4 in. wide	3 to 3¼c. "
Horse Shoe Iron ⅜ to 1 wide by ⅜ to ⅝ thick	3½ to 4c. "
Norway Nail Rods	7 to 7½c. "
Black Diamond Cast Steel, Flats, Squares and Octagon, ordinary sizes	15 to 15½c. "
Machinery Steel	10 to 11c. "
Cast Spring Steel	9 to 9½c. "
Homogeneous Steel Plate	9½ to 10c. "
Perkins' Horse Shoes, per keg of 100 lbs	$4·62½
" Mule Shoes " "	5·62½

Common Horse Nails, from 14c. to 18c. per pound.

	10	9	8	7	6	
Putnam Horse Nails	23	24	25	26	28c.	per ₱.
	10	9	8	7	6	
Globe Horse Nails	23	24	25	26	28c.	per ₱.

R. R. Spikes ..... 2¾ to 3c.

Messrs. R. C. HOFFMAN & Co., Iron and commission merchants, Nos. 23 and 25 South Frederick street, report the Pig Iron market as follows, under date of April 10: The Iron market continues without change; transactions light and market dull. We quote prices as follows:

Baltimore Charcoal	$32·00 @ 35·00
Virginia "	28·00 @ 34·00
Anthracite No. 1	23·00 @ 24·00
" No. 2	22·00 @ 23·00
" No. 3	20·00 @ 21·00
White and Mottled	17·00 @ 19·00

FOREIGN.

FRANCE.

(*Moniteur des Interets Materiels*).

PARIS, March 26, 1876.—*Metals.*—The European metal markets during the week have been generally quiet, without notable changes in value. Sellers show little anxiety to realize at existing rates, nor are consumers apparently inclined to anticipate wants till spring trade shall have opened more fully than is so far the case. As regards the spring business, much will depend upon crop prospects; the floods have retarded field labor materially in many prominent localities all over Northern and Central Europe. The more or less abundance of crops, and the question of wages have such an important bearing on each other, and industry is so much ruled by them, that many dealers in metal prefer to wait a little, till they can see clearer, and feel satisfied on the crop outlook. This will sufficiently account for the prevailing quiet. *Copper.*—There is rather a firmer feeling, based on the knowledge that the Copper now on the way from Chili to Europe is mostly owned by strong parties, and as ruling prices are not high, but in accordance with the cost of production on the West Coast, this metal again inspires a fair degree of confidence, although as yet unaided by speculation. Paris forms an exception, and has been inactive and weak. We quote, deliverable at Havre, Chili Bars, 200 francs the 100 kilos; Common ditto, 197·50; Ingots, 210; English Tough Cake, 210, and pure Corocoro Ore, 205. Havre has remained remarkably quiet, first brands Chili Bars, 201·25 to 202·50; good current, ditto, 198·75 to 200, and Lota and Urmeneta, 197·50. Marseilles, after a rise of some moment, is less firm, probably in response to our own market. The stock there is evidently too large for the moderate consumptive demand; they quote Red Tokat, 200; small ingots, 210; round ones, 245; Sheathing, 240; Yellow Metal Sheathing, 210 to 215 francs, all the 100 kilos, less 3 per cent. for cash. *Tin* for the moment is devoid of excitement; the receivers of Australian, upon cables from the country of production, are evidently more confident in the maintenance of present prices, and have pressed what they have got and what is on the way for them with less urgency, and this has imparted a stronger undertone to the London market, which in its turn has lent support to the Continental ones. Much will depend on the official statement of the month's deliveries; if fair, the price will be sustained. We are weak here at 220 francs for Banca, deliverable at either Havre or Paris; Straits, 197·50; and English, at Havre or Rouen, 197·50. At Marseilles but little has transpired, and prices are ill supported. Stocks there have now reached a respectable aggregate, somewhat in excess of current consumptive requirements; they quote Straits 195 to 200, and Billiton 195. *Lead.*—On various late occasions we have given it as our opinion that the importance of Spanish pacification, as bearing upon the Lead supply, had been greatly exaggerated, and the course of the markets now justifies what we have said, and still maintain, that even supposing Spain produced a little more in all the current year, stocks in second and third hands are sufficiently reduced to counteract, in the immediate future, any such influences. Spanish Lead is now in more active request, and has recommenced an upward movement. Our own market has, nevertheless, yet remained listless, and the range remains between 55 and 56 francs the 100 kilos. Havre reports no alteration, while Marseilles is quiet. The quotation there is 51·25 to 51·50 for Soft Refined, and 51·50 second fusion. *Spelter.*—Makers in England are selling at such low figures that Silesian has been forced off at a decline across the Channel, which does not much stimulate the Continental markets, as it is to be supposed England will not be a buyer of Silesian for some time to come. Similar causes have produced a complete paralyzation in our own market, and prices are nominal. We quote the range here and at Havre 63·50 to 65 francs the 100 kilos. Marseilles is stagnant. *Iron.*—Some revival is again reported from some quarters, especially in foundries and some factories of minor hardware. It is evident that if any revival is to come, it will be in districts like the Ardennes, Vosges and Franche Comte, from whence we have these more encouraging reports, since they manufacture certain specialties of large international consumption. The bulkier Iron goods have less of a chance since Steel has become such a formidable competitor. Prices are, on the whole, tolerably firm, and at the North 185 francs is becoming a fixed quotation for Merchant Iron, while here we are steady at 200. With *Coal* we are now entering upon the dull season, and this fuel is now devoid of interest, without much of a prospect of either a material rise or fall during the ensuing six months.

BELGIUM.

(*Revue Universelle*).

BRUSSELS, March 26, 1876.—*Iron.*—We are glad to be able to announce that Iron matters continue to improve in Belgium, and that our workshops are recovering their wonted appearance of activity which preceded the close of 1873. The principal orders are for architectural Iron work and tramway Rails, to which there will soon be added, we presume, some orders for Iron or Steel bridges, the floods in Central Europe having swept away many of the rickety old wooden structures of the kind, which nobody will be sorry for, after the remaining more general destruction shall have been got over. But bridges and tramways are also being built in some remoter countries, and we hope to have the benefit of furnishing the Iron, &c., for some of them, among others for the works to be undertaken by the Dutch government in the Island of Java, at Batavia. A bridge and railway is to connect Batavia with the interior. Various railroad material orders are to be filled, beside, for this city and vicinity, Antwerp and Elberfeld, in Prussia. *Coal.*—The greater animation observable in the Iron districts of our country has not as yet exercised much influence on Coal, which continues in moderate request at tolerably steady rates. After a while Coal will, however, be benefited by the change. The official statement is to hand, showing the Coal movement during the first month of the year. We have received from abroad 69,000 tons, against 56,000 and 39,000 in 1875 and 1874, while we exported 331,000 tons, against 319,000 and 218,000. Except a few recent adjudications on tender, the Coal movement has been but a restricted one, due in some measure to the flooding of some Iron works which were situate on the banks of rivers and canals.

GERMANY.

(*Borsenhalle*).

HAMBURG, March 25, 1876.—*Metals*—Trade in this line in Germany is recovering more slowly than in the more western Continental countries, which is in a great measure due to the kind of foreign custom which we have got, such as Russia, Scandinavia and Austria, where the long winter on the one hand, and the floods on the other have retarded the opening of spring traffic. In Germany stocks are not large, and the prospect is if anything encouraging, unless it be subsequently marred by doubtful crop prospects. *Copper.*—Our home markets offer no change worth recording; business is confined to attending to more pressing wants, and prices are somewhat irregular. At Berlin good qualities English and Australian are quoted 89 to 91 marks the 50 kilos. Stettin remains steady at 99. *Tin.*—Our markets are exceedingly quiet. At Berlin Banca is worth 87 to 87·50, and English 81·50 to 82. *Lead.*—This metal remains firm, and may be susceptible of a slight improvement as we approach the more active spring season, stocks being moderate, and prices not high. Nothing can be reported as having transpired in our own midst, but Berlin is well supported at 22 to 22·30 marks the 50 kilos, for Hartz, Tarnowitz and Saxonian. *Spelter.*—Although the English market has ceased to be much of an outlet for any surplus of Silesian at present, we have, nevertheless, upheld a certain degree of firmness in the German markets, after the weak parties to whom we have alluded in former reports have been able to rid themselves of stock which they were financially incapable of holding. The fact is that makers in the Silesian Mountains have during the winter, sold largely ahead their produce, and now feel independent, and what remains in dealers' hands is now under firm control. Berlin quotes 25·20 to 25·20, and Breslau 24, without much doing.

HOLLAND.

(*Koch & Vlierboom*).

ROTTERDAM, March 23, 1876.—*Tin.*—Although the market is quiet holders uphold their prices with much firmness, and business is thereby reduced to a mere trifle at 49¼ guilders for Banca. The pending company's auction sale is so near at hand that nobody cares much to enter upon any transactions of moment. Billiton continues to be taken currently at 45¾, but a plump offer now would, in all likelihood, procure some at 45¼. March 28.—*Tin* is nominally worth 49 for Banca; to-day's auction will decide of the immediate future.

SPAIN.

(*Epoca.*)

MADRID, March 22, 1876.—*Lead.*—The Linares lead mines, situated in the rich mining district of Linares, together with the Fortuna and Alamillos mines in the same locality, are in a most prosperous condition. So far from being exhausted by an output of enormous proportions during a number of years, these mines are increasing in value, and the dividends paid to shareholders are becoming larger still. Of the permanent character of these mines there cannot now be any doubt. The half-yearly dividends, due on the 1st proximo, yield at the present market price of the shares the following annual profit: Linares, 20 per cent.; Fortuna, 15¾ per cent.; and Alamillos, 11¼ per cent. As perchance disappointments may be ahead the directors have, however, decided that a reserve fund be established for each company, which reserves are to be invested in English Consols, to be increased every half-year by a sum written off from the profits.

EAST INDIES.

(*Gilfillan, Wood & Co.*)

SINGAPORE, Feb. 9, 1876.—*Tin.*—Moderate supplies from Malacca and more favorable news from London caused an advance to $23 per picul, but since then less favorable advices have been received from the other side, and the price has declined to $22·62½ per picul. In Penang stocks are reported to be small, and the price steady at $22·25 for unsmelted Tin. Feb. 23.—The market has been very dull, owing to unfavorable news from home, and the price of ordinary Malacca has decline 1 to $22. In Penang there has been an equivalent decline, unsmelted Tin having fallen to $21·62½. Stocks are small in both markets, and present production is limited by very dry weather. There have been shipped to the United States, during the past month, 4605 piculs, against 6895, 5133, 3572, 3424, 2753 and 1355 in 1875 to 1870. Tonnage continues abundant, and rates are weak. The I. F. Pearson loads for New York, nearly all for owners' account. The Albert Russell has been chartered for Boston on secret terms. Exchange has declined to 3/11⅛ for 6 months' sight credit drafts on London.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

SHEFFIELD, ENG., March 27, 1876.

TRADE PROSPECTS

are not brilliant. They are not even good, nor have we "great expectations." We have no promises worth mentioning, and we cannot see any likelihood of a war breaking out on a large scale in any quarter of the globe. We are, in the aggregate, men of peace, but individually not a few of us would not object to have a rupture in order to give trade "that stimulus it so greatly needs"—and that sort of thing. Personally pious, we are becoming deeply depressed at the dead times which have befallen us, and some of our rank and file begin to think that a mild spell of wickedness (in the shape of a war) might "square matters up." In whatever direction we look from our British standpoint, peace prevails, and trade is dismally bad. A few nations, including our own, are arming rather heavily, but at present there is not the slightest prospect of a row. Heavens! what a world it is.

A FEW FACTS

are generally understood to be useful in a correspondent's letter. I assent to the proposition in its entirety, but in detail it is perhaps hardly worth dwelling upon. Facts are stubborn things, as all newspaper writers are but too well aware. Some facts will bear any sort of interpretation. Others won't bend at all, but stand up erect, stiff, bristling and unyielding as the several quills of our old friend, the fretful porcupine. First fact, then, that the West Cumberland Iron Company are about pulling down six blast furnaces at their Millom Works, in order to immediately reconstruct them on improved principles. One of the new furnaces will be 70 feet in hight, and all of them will be filled with Whitwell's patent hot-air stoves. Second fact: That the Belgian iron masters are "doing all the business" in London in channelled iron, girders and common bars, to the unutterable consternation of the metropolitan agents of British firms. Fact third: That prices are everywhere very weak, particularly as regards finished iron and iron rails, Staffordshire bars being, as heretofore, £10 (nominally) for best brands. Fact fourth: That the steel rail mills here and there are doing a better business, and (fact fifth) that the rails are being made and sold in any quantities at under £8 per ton, or not much more than 30/ higher than ordinary iron rails.

IRON AND STEEL INSTITUTE.

After the above formidable array of facts, I am not quite certain as to the advisability of pelting the editor with a further mass of information relative to the meeting of the Iron and Steel Institute to-morrow, in London. Nevertheless, I will run the gauntlet, and (primarily) state that to-morrow evening there will be an inaugural dinner at Willis' Rooms. Everybody will admit that no good could possibly come of a meeting ungraced by a dinner. Then, on Wednesday, the Bessemer medal will be presented to Mr. Mushet, and, subsequently, the members will plunge *in medias res*, according to the following programme: Mr. J. T. Smith (at the request of the council) will introduce for discussion "The Use of Molten Iron Direct from the Blast Furnace in the Manufacture of Bessemer Steel." Reply of Mr. Snelus to remarks made upon his paper on "Fire Clays," &c., at the last general meeting. Discussion on "Strength of Rail Joints," paper read by Mr. Sandberg at supplementary meeting. Paper by Mons. F. Gautier, Paris, "On the Uses of Ferro-manganese." Paper by Mr. H. W. Pendred "On the Ferroux Rock Drill." In the evening there will be a further feed, after which speeches will be made, and Great Britain will, doubtless, *not* be referred to as the Pioneer of Progress, the Foremost in the Van of Intellectual and Scientific Advancement, the Greatest Seat of Industry in the World, the Home of Liberty, the Paradise of Patentees, etc., etc. By no means! On Thursday and Friday the matters on the agenda paper are:

Thursday.—Paper by Mr. J. Pattinson, Newcastle, "On Carbon and other Deposits from the Gases of Blast Furnaces in Cleveland." Paper by Mr. E. F. Smith, Dudley, "On the Casson-Dormoy Puddling Furnace." Paper by Mr. Henry Hundyside, Bristol, "On Overcoming Steep Gradients on Railways." In the evening the council will be entertained at dinner at the Mansion House by the Lord Mayor.

Friday.—Paper by Mr. T. Nordenfelt, "On the Norwegian Iron Mines near Bodoe." Paper by Mr. George Dove, Jun., Frodingham, "On the North Lincolnshire Iron District." Paper by Mr. Michael Scott, London, "On Improved Casting Arrangements for the Siemens-Martin Process."

SUSPENDED OR OVERHEAD TELEGRAPHS.

This is a vexed question which has of late received a tolerably thorough ventilation in the columns of the provincial and London press, owing to the serious interruptions of the ordinary working which have been caused by the gales and snow storms, in addition to the fact that loss of life has thereby ensued. On most of the railway lines the wires have been borne down to the ground by miles in length, and in London, a poor fellow driving a vehicle was caught by a falling wire and almost completely decapitated. This case of *sus: per: coll:* at once brought down the newspaper leader writers, and they almost unanimously cried out for the wires to be wholly carried underground. In towns this is quite practicable, and is generally adopted, but it would be a matter of (almost) impossibility to carry them from town to town in that way. The earth currents would be so powerful, particularly in wet weather, that currents from the batteries would be almost wholly negatived. In Germany, it is said, nevertheless, the experiment is to be tried on a comprehensive scale. The result will be interesting to us here.

DEATH OF JOHN KANE.

John Kane, originator and secretary of the National Ironworkers' Association, operative secretary of the Northern Iron Trade Arbitration Board, and editor of the *Ironworkers' Journal*, died somewhat suddenly on Tuesday last of apoplexy. "I knew him well;" he was a man of much intellectual power, a thoughtful, good speaker, and, although a prominent trades' union leader, was not given to rodomontade, or, to throwing about firebrands in times when the men were asked to make concessions. He was born at Alnwick, in the domain of the fiery Percy, and for the most part was a self-educated man. When Chartism first reared its puny flag, John Kane was one of the sturdiest of its standard bearers. He lived longer than the Chartist programme, however, although he saw some of its "points" adopted to a certain extent by the more recent Reform Act. The union he founded has grown until it numbers 35,000 members, all of whom owe John Kane, and his indefatigable wife (who does all the office work), a debt of gratitude.

SCOTCH IRON TRADE.

The "land o' cakes" is at present almost bare of features of interest, shades of Scott and Burns, nevertheless! When I make this remark it will of course be readily understood that I have no wish to traduce the "Scots wha' bae'," &c., but merely to state a trade fact. The only matter which is powerful in Scotland at the present time is, I take it, the concentrated stench of Greenock! Cologne is any quantity per cent. sweeter than Greenock, bad as the City of Sweet Waters has been declared to be. Even Glasgow, the powerful capital of Clydeside, doesn't yield me much that is worthy of being commented upon. Messrs. Watson & Co., writing me on March 24th, reports a quiet market at 58/3 to 59/3, for cash warrants. The shipments last week were 7648 tons against 10,614 tons in the corresponding period of 1875. Makers' prices are about as under:

	No. 1.	No. 3.
G. M. B., at Glasgow	59/6	58/6
Gartsherrie, "	68/	59/6
Coltness, "	70/	60/6
Summerlee, "	67/	59/6
Langloan, "	68/6	59/6
Carnbroe, "	63/6	59/
Calder, at Port Dundas	70/6	59/6
Glengarnock, at Ardrossan	66/	59/6
Eglinton, "	58/6	57/6
Dalmellington, "	58/6	57/6
Shotts, at Leith	68/6	61/6
Kinneil at Boness	62/	59/

In other respects, the Scotch iron trade does not present a fact worth chronicling.

BRITISH IRON TRADE ASSOCIATION.

The terms of contribution to this newly formed association are just published, and strike one as being somewhat ingeniously framed. The payment is fixed at 2/ per unit, no contribution to be less than £2, nor more than £10. In detail the contributions will be:

	Units.
Each ordinary Puddling Furnace	1
Each double Puddling Furnace	2
Each rotary Puddling Furnace	3
Each Blast Furnace producing less than 300 tons per week	8
Each Blast Furnace, producing above 300 tons per week	10
Each Bessemer Pit	30
Each Siemens-Martin Furnace	4
Proprietors of works where iron and steel are consumed, contributions to be by number of hands employed, each 100 hands counting	10
Others not included in above	20
Lessors of Mines	100

A FEW "PROMOTERS" WANTED.

A gentleman at Sheffield has received a circular dated from London, which commences by laying before him what it terms "a splendid opportunity for investing a small amount of capital." Why the general public should be thus appealed to is not stated, but the openness of the attack leaves one to infer that it must be attributable to that unselfish generosity which is the characteristic of all truly noble

minds. The circular proceeds to state that "a syndicate is in course of formation for the purpose of floating a company near London," and winds up by stating in an airy, light-handed sort of manner that the profits will be at least 100 per cent.! In order to set the thing going properly only £2000 is required, and the sender of the document will condescend to receive any sum of £25! This disinterestedness affects me greatly—it does, indeed! When I look around me and see how many people are fooling away their money and lives without attaining 100 per cent. I feel tempted to realize all my worldly possessions and throw the result into "the imminent breach"—so that the world may reap its 100 per cent. and continue to wobble through space rejoicing!

THE DARLINGTON IRON COMPANY,

one of the chief iron rail producing concerns in Great Britain, presents rather a sorry report to the "my lords, ladies and gentlemen," who are its shareholders this year. There has been a loss on the year of over £10,500, "the past year [say the directors] having been one of unprecedented depression in the iron rail trade, and the dullness still continues. If the directors of this company are the wise men collectively that I know some of them are individually, they will set their house in order at once and set up some Bessemer plant for the purpose of going into the steel rail trade.

BESSEMER PRODUCING, AND PERSONAL.

The Phœnix Bessemer Steel Works of Messrs. Steel, Tozer & Hampton, near Sheffield, are stated to have produced 10,000 tons of steel ingots since January 3d last. Last week not less than 1120 tons of ingots were manufactured from two 4-ton and two 5-ton converters. In this feat only one pig iron and one spiegeleisen have been used in each pit. From this total of Bessemer material, upward of 900 tons of rails have been rolled during the week in one 22 in. mill. In the whole lot there was not one inferior ingot, bloom or rail. It may interest you to learn that Mr. Steel is one of the two or three leviathan betting men of this country. He was born in Sheffield, I believe, and in early life was a fishmonger. He had a talent for "making books," however, and, in course of time, gave up his piscatorial connection, and went about to race meetings, having his headquarters in London. There he ultimately kept a staff of clerks in a fine suite of offices, in order to keep the books recording his transactions with various "my lords" and "Sir Harrys." His bets are said, at last, to have been mostly with the titled patrons of the turf, and he is stated to have accommodated the Heir Apparent to the British throne so heavily at sundry times that H. R. H. still pays interest on a couple of hundred thousand pounds. Whether this is strictly true or not I cannot say, but it is a fact that Mr. Steel now lives in a big house, at Sheffield, and that his sons and daughters are as gentlemanly and ladylike as others of their ilk whose money has been obtained in other reputably more honest ways—such as *stock jobbing*, for instance! Mr. Tozer was, until Christmas last, managing director of Sanderson Brothers & Co. (Limited). He is a good business man, and is master cutler for the present year. Mr. Hampton was one of the founders of the Phœnix Works. He afterward sold them to a company which came to grief, and is now the practical manager of the manufacturing departments, and third partner in the firm.

THE BRITISH DOCK-YARDS.

The work to be got through in our dock-yards during the present year is to be on eight ironclads of 8037 tons; on eight corvettes, 2555 tons; on 10 sloops, 1375 tons; on two dispatch vessels, 1200 tons; and six gunboats, 240 tons; total on 34 vessels, 13,497 tons, to be built during 1876-77 in dock-yards. The work to be done by contract on iron-clads is 3356 tons; and on 41 unarmed vessels, 6909 tons; total 10,265 tons, to be built during the year; making a grand total of 23,762 tons. The numbers of men to be employed on ships building, and for completing new ships afloat for sea service, will be 5691, as against 5194 last year; and upon repairs and refits (including new boilers) of ships for reliefs and for first reserve; on casual repairs and maintenance of ships in commission, gunnery and training ships, tugs, yard crafts, bulks and contingencies and on yard manufactures, and on yard and harbor services, 10,309, as compared with 10,699 in the expiring financial year. If this be done in the green tree of peace, what shall be performed when the dry wood of war comes before us? We don't get more than one or two iron-clads a year launched, and about the same number sunk, so that we are not progessing greatly in the matter. We may even yet have to fall back upon the "wooden walls" at present so contemned and despised.

THE RINK MANIA

at present shows but the slightest symptoms of falling off. It flourisheth like a green bay tree at all the seaside winter reports, and as the hot weather comes on there will be a vast crop of asphalted rinks in every little hole and corner collection of lodging houses on the sea beach. In many cases buildings are being erected for rinks, but the probability is that the rage will be over before these structures are finished. Meantime, all sorts of inventors, patrician and plebian, are in the field, and some manufacturers are "making a pile" out of it. The law courts are also busied in granting injunctions against various patentees at the instance of others, prohibiting the use of certain skates or inhibiting specified improvements of a wonderful nature. Thus the game goes on merrily and madly enough. Whether it will last longer than the velocipede mania is questionable. It certainly hardly appears probable.

SOUTH WALES IRON TRADE.

Last week 1071 tons of iron were exported from Newport and 660 from Cardiff. In the general state of trade in the Principality there is again no change to report. None of the works, except Dowlais and Ebbw Vale, are doing anything.

THE METAL MARKETS

have been very weak since I last wrote, and prices have declined.

Von Dadelszen & North's report states: "*Copper.*—Chili bars early in the week advanced to £77. 10/ buyers, but have since declined to £76. 10/, our present quotation. Australian not inquired for, £85. 10/ the nominal price of both Wallaroo and Burra. English copper is cheaper; tough, £83; select, £84; manufactured strong copper, £89; India sheets, £88. *Tin.*—The advance of last week has been completely lost; sales of Straits and Australian have been made, both on the spot and for forward delivery, at £72 to £72. 10/. English is easier; common ingots, £76 to £77. *Tin Plates* unchanged. *Lead* dull; English pig, £21. 10/ to £21. 15/. *Spelter.*—The only transaction reported has been 25 tons Silesian, at £23. 12/6. *Quicksilver*, £10 per bottle."

Liverpool current prices are as under:

Tin Plates: f. o. b. in Liverpool, per box.

	£	s.	d.		£	s.	d.
Charcoal, I. C....	1	5	0	@	1	8	0
Coke, I. C.....	1	0	0	@	1	2	6

Copper: Delivered in Liverpool, per ton.

	£	s.	d.		£	s.	0
Bolt and Sheathing.....	97	0	0	@	0	0	0
Tile...	90	0	0	@	0	0	0
Tough cake.....	90	0	0	@	0	0	0
Best selected..	92	0	0	@	0	0	0

The Stagnation in Pittsburgh.

The labor organ in Pittsburgh, for the purpose of proving the manufacturers' words false, has been publishing a weekly statement of the condition of the mills in that city, which has in no slight degree misled the boilers. Its object has been to show that, notwithstanding the assertion of the iron masters that they had no orders, there was plenty of work. It heads these, "The following is the report of the Pittsburgh District Deputy." A specimen of the reliability can be found in the first item of the last issue, which is to this effect: "Eagle Iron Works running single." The Eagle Iron Works have 31 boiling furnaces, and but 17 have been worked for weeks.

These reports have had no effect in Pittsburgh, but they have given the impression outside that Pittsburgh was full of work. This has given the union officers trouble. They have been "hoist with their own petard," and in the same issue the District Deputy hastens to remove the impression about the labor market. He says, writing to the editor of the labor organ: "Many of our people have taken a wrong impression from your weekly mill reports. I am speaking of the boilers and helpers outside of the First District, and in order to avoid any misunderstanding I will briefly state the situation of the trade here at the present time. Out of 40 mills, containing about eight hundred boiling furnaces, 9 mills, containing about two hundred boiling furnaces, have been idle from two months up to nearly two years, throwing out of employment nearly eight hundred puddlers and helpers. In 20 mills, 249 furnaces are running about half-time, single turn, which formerly run double; consequently this would cause nearly five hundred more men to be out of employment. In the balance of the mills, 12 in number, 351 boiling furnaces are running about half-time, double turn, with in the neighborhood of 1400 idle men of our own to support. Strangers will have an idea of what their chances of getting employment would be. Therefore I would advise all who contemplate emigrating to Pittsburgh for the purpose of seeking work at boiling to defer it until times are brighter than at present.

"I have been in conversation with many puddlers from different parts of the country, who, from our first mill reports, were led to believe that work was plenty, and came here expecting to get work, but after traveling the mills from day to day, finally gave up in despair and are now trying to get away. To prevent others from the same disappointments, has been my sole motive in making the above statement."

Coal Dust and Mine Explosions.—At a recent meeting of the British Royal Society, Mr. W. Galloway discussed, in a paper which he presented, the part which coal dust plays in coal mine explosions. It is assumed that the dust has had much to do with the violence and magnitude of many coal mine explosions. As suming this he says: "It is an obvious conclusion that explosions of this kind will be most likely to occur where the air in the mines is driest; for at such times not only will the coal dust be most easily raised into the air by the local explosion (which we may suppose to happen at any rate), but it will also be turned more easily than when it contains a larger proportion of moisture. A number of such considerations leads to the conclusion that explosions whose magnitude is due to the influence of coal dust will happen most frequently during cold weather; and, similarly, we might expect to find that the magnitude of those explosions which occur during cold weather is sometimes traceable to the influence of coal dust. The statistics show that the frequency of explosions occurs thus: December, 10; February, 6; March, 6; July, 5; October, 4; November, 4; April, 3; May, 3; June, 3; January, 2; August, 2; September, 1." Mr Galloway suggests that the airways and roadways of coal mines be watered to lay the dust.

Tests and Strengths of Railway Materials.

From a paper read by R. M. Bancroft, at a recent meeting of the British Civil and Mechanical Engineers' Society, we make the following extracts. The facts presented are those which the author has collected and has made use of in specifications at various times:

WROUGHT IRON.

The tensile strength of good wrought iron is nearly four times greater than that of cast, viz., 24 tons per sectional inch. Mr. Mallet gives 23 to 24 tons, and Mr. Kirkaldy 25 tons for bars and 22 tons for plates. Mr. G. Berkeley gives as his experience of breaking strength:

	Average.	Minimum.	Average Stretch.
	t'ns	t'ns	
Plates.....	20	19	1 in. in 12 in. lineal—8·33 p.c.
L and T...	23	..	1¼ in. in 12 in. lineal—10·5 p.c.
Rivet Iron.	8	..	....

The Admiralty would seem to have a good opinion of Low Moor and Bowling iron, for in a late specification for boilers, they mention that all plates, with the exception of these, will be tested, and must be capable of standing the following tests: Tensile strains per square inch, lengthways, 21 tons; crossways, 18 tons. Forge test (hot), plates to admit of being bent hot without fracture to the following angles: lengthways of the grain, 125°; across, 100°. Forge test (cold), plates to admit of being bent cold without fracture to the following strains:

	⅛ in.	¼ in.	½ in.	⅝ in.
With the grain.	20°	25°	35°	35°
Across the grain.....	5°	10°	15°	15°

BRIDGE TESTS.

A piece of iron 2 in. wide and ⅛ in. thick, and of sufficient length to have 7 in. under actual tension, to be cut from any plate intended to be used on the work, and the following tensile strains applied, the plates of similar manufacture to be rejected if the extension of the piece tested is greater than ⅛ in. under 18 tons, ¼ in. under 21 tons, ½ in. under 23 tons, ¾ in. under 24 tons; all bars and L irons being required to bear a tensile strain of 25 tons before fracture. The links of the chains used in the Chelsea suspension bridge, which are about 13 ft. long by 8 in. wide, were tested with a strain of 13⅛ tons per square inch, it being specified by the engineer that the iron used should stand this strain without a permanent elongation of more than in 1-40 in. in the 10 ft. length. Bars made in a similar manner to these links had broken with an average of from 27 to 28 tons per inch. Messrs. Clarke, Reeves & Co., American bridge builders, specify in their work that all bars subject to tensile strains shall be tested to 20,000 lbs., or nearly 9 tons per square inch, and struck a smart blow with a hammer while under tension, and if any show of imperfection they shall be rejected. I mention this foreign test because in a competition this firm secured a contract against English firms. For bridges of large spans some engineers specify different tests for the larger spans; for a 100 ft. span, average breaking strain of plates per square inch to = 45,000 lbs., or 20 1-10 tons; for the same span, average breaking strain of channel irons and bars per square inch, to = 50,000 lbs., or 22⅜ tons; for a 200 ft. span, all parts to be exposed to a tensile strain of 60,000 lbs. per square inch, = to 26·78 tons. In building Blackfriars Bridge, experiments were made from time to time, as mentioned by Mr. Carr in a paper read before the Institute of British Architects, and the extension of 1-625th part of the length was given by strains varying from 13 tons to 15 tons (instead of 16 tons, as specified); but even with this, the elastic limit is just about four times the working load, which is ample allowance for safety, taking into account a very large deterioration for time and corrosion. The limit of elasticity of wrought iron under tension is that point at which the elongation ceases to be in uniform proportion to equal additions of load, and commences very nearly with the point at which visible set takes place. A bar 1 ft. long, and 1 in. in sectional area, should be elongated at least 15 per cent. before breaking. The crushing weight is from 12 to 15 tons per inch section, or about half that of tensile resistance. It is sometimes specified that it must be equal to 16 tons per inch, and that it must not show any signs of failure at 8 tons per inch. In specifying or ordering wrought iron, size as well as quality must be borne in mind. L iron, without extra price runs from 3 ft. to 25 ft.; T iron without extra price, runs from 3 ft. to 21 ft. Some L and T irons are rolled from 30 ft. to 40 ft.; as a rule, it is of the middle size that long lengths are rolled. L iron can be got rolled up to 40 ft. without any extra charge when the specification is a good one, and does not include more than a fair share of such lengths; and they may even be rolled to 50 ft. and 60 ft., but the difficulty of carriage enhances the cost. Plate iron must be of a regular shape, and should not exceed 15 ft. by 4 ft., otherwise an extra charge will be claimed for rolling. Mr. David Kirkaldy has just completed a valuable set of experiments upon wrought iron plates manufactured by Fried. Krupp, of Essen, Rhenish Prussia, and six Yorkshire firms. The experiments were made from plates, 4 ft. by 3 ft. by ⅝ in., ½ in., and ⅝ in. thick—those most generally used for boiler making. Two hundred and twenty-four specimen tests were made from pieces of these plates, and are carefully preserved in Mr. Kirkaldy's museum. The experiments have been made (1) to ascertain the elastic and ultimate strength, softness and ductility under pulling stress; (2) to ascertain the effects produced by drilled holes and by punched holes under pulling stress; (3) to ascertain the resistance to, the effects under, bulging stress; (4) to ascertain the resistance to, the effect under, bending stress. The facts elicited in these experiments, which are very voluminous, will convince the Admiralty that they should at least give Krupp's plates an equal position with Yorkshire ones.*

CAST IRON.

In round numbers the strength of cast iron in compression equals the square of the tensile force, or, in other words, the resistance that cast iron of good quality gives to a crushing or compressive strain is variously stated by authorities on the subject at from 40 to 43 tons per square inch of section, and from 6 to 8 tons per sectional inch for tensile or stretching strain. Tabulated it stands thus:

	Breaking Strain.	Safe Working Strain.
In compression..	40 to 48	7 tons
In tension.....	6 to 8	1½ "

It is clear from this that cast iron of good quality may in compression be strained to one-sixth of its greatest strength, and in tension to about one-fourth. Cast iron of good quality will, when first broken, have a crystalline texture, and a slight indentation will be made if struck smartly with a heavy hammer. Sometimes this metal is specified to bear a tensile strain of 2½ tons before loss of elasticity, and 6½ tons per square inch before fracture. Test bars should be run each day as the castings are being made, and a good plan is to specify that the test bars must be cast on to the ends of the castings. One test is, that a bar, 2 in. deep by 1 in. wide, placed on bearings 3 ft. apart, with a load of 25 cwt. placed on the center should give ⅛ in. deflection, and carry 27 cwt. without breaking. A second test is that of a bar 1 in. square, placed at 46 ft. 6 in. bearing. In this test the bar should not break with a less load than 600 lbs. placed on the center. The above tests are for iron to be used in compression. When required to be used in tension, even higher standards are advisable. Some engineers insist that these shall be dead weights, and that no strain shall be applied in any way by levers; and in important contracts test bars must be cast in duplicate, one to test, and the other marked with the date when run, and kept for future reference by the engineer. The area of the flanges of cast iron girders should be in the proportion of 6 or 7 to 1; but the upper flange, where the girder is isolated, and not held in position by the structure itself, should be proportionally wider, according to each particular case, as it has to resist flexure, which would possibly deform it before compression of the flange could occur; but where the web and upper flange are supported by the structure itself, as in the cases of arches and flooring, the above proportion may be taken. I am indebted to Mr. Moreland for some particulars relating to proportions in iron work. As a general rule we may, in designing cast iron girders, make the depth from one-twelfth to one-sixteenth of span; bottom flange, two-thirds to three-fourths the depth in center; top flange, one-third to one-half the width of bottom; maximum span, 25 ft. With greater spans than this wrought iron becomes as economical, and safer. I believe some of our members are of opinion that strengthening webs or ribs should not be cast in girders, as the metal is drawn away from the flanges in cooling; others say that at the junction of web and flange, the rib, if broken away will frequently be found honey-combed. The usual modes of testing rails are: 1. Dead central weight, or static test; 2. Dynamic, or test by impact; 3. A combination of first and second, —first by the central and afterward by the falling load; 4. Chemical or acid test; 5. By rolling weight. To these might be added that of torsion, or twisting. A good steel rail, as used on the English railways, will deflect 1-16th of an inch in a span of 6 ft. when a locomotive engine is passing over it. Taking the tests *seriatim*, it seems to me that the test by a falling weight is more to detect brittleness than a test of deflection, and being a destructive one, only 1 or 2 per cent. of the quantities are tested, and the rest of the turn is supposed to be like them. For the test of brittleness, it has been suggested that a good method would be to drop rails from a given hight on to a hard platform, which would certainly detect any cold-short ones. To detect brittle rails is certainly most important; yet it is difficult to imagine how the loads passing over rails come with the suddenness of a blow from a test monkey. Some engineers say the endeavor to ascertain whether a rail has sufficient toughness by submitting it to the action of a falling weight is most deceptive; the test goes as far beyond the mark as that by a dead weight falls short of it, because it requires an amount of toughness which is quite unnecessary, and inconsistent with a proper degree of hardness. Dead central weight tests determine the strength of a rail as a girder, the deflection and set being noted after each successive increment of stress. These tests being usually made upon bearings varying from 2 ft. 8 in. up to 5 ft. and 6 ft. it is a question whether the amount of deflection shown by so short a length of rail without being damaged by a permanent set is not too small to be accurately measured; and the difference of the deflection which would be re-exhibited by a short piece of very good iron and a similar piece of very bad iron would at any rate be too small to afford any certain gauge of its qualities.

The acid test is made by cutting off a slice from the end of a rail, and after polishing, immersing it in dilute acid, which eats away all impurities, leaving a lot of cavities and furrows, thus showing up the fiber or grain of the metal very plainly. With most metals chemical analysis is in itself a complete and sufficient test of quality, but not in steel. The toughness of steel may be altered by sudden cooling, and although the effect of this operation, and generally the effects of tempering, are greater when the quantity of carbon is considerable, yet it acts more or less in the mild qualities of steel, so that we cannot rely entirely on the aid of the chemist, but must fall back on mechanical tests, which prove not only the material but the workmanship. The rolling weight test is made by heavy rollers fixed in a frame-work and radial bars connected to a central boss after the form of a turn-table; motion is imparted to a central vertical shaft by means of shafting and wheels underneath, which is driven by steam-power. It can be made with or without springs; without springs the test is more severe, but by using springs the rollers may be lightened and greater weight thrown into the frame. The rails to be tested are formed into a circle or polygon, supported on sleepers packed with ballast in the usual manner. If the rails are bent in a circular form, Mr. Price, the patentee, says in his experience the texture of the iron is of no moment, provided the rails are bent at a dull red heat, but they may be arranged as a polygon, which plan possesses the collateral advantage that the rollers wear more evenly over their entire surface.

THE METROPOLITAN RAILWAY TEST

is as follows: Rails weighing 86 lbs. per yard are tested by a dead weight produced by hydraulic pressure. A piece of the rail is placed upon 5 ft. bearings, and a slightly curved iron surface 3¾ in. in width is made to press upon the center of the rail. The test is that under these conditions a pressure of 40,000 lbs. shall not deflect the center of the rail more than 1 in.; also, that 60,000 lbs. shall deflect it 9 in. without breaking it. The following are tests for iron rails 75 lbs. per yard: 1. Each of these rails, placed on two supports 3 ft. 8 in. apart, must carry for five minutes in the center between points of support a hanging weight of 12 tons, deflection 0·15 in. as a maximum, and when the weight has been taken off the permanent set must not be more than 0·04 in., or 1 millimeter, and on condition that, at the second placing of the same weight, the deflection does not increase more than one-fiftieth of an inch, or one-fifth of a millimeter. 2. Each rail in the same position must carry also for five minutes, without breaking, a weight of 30 tons; then, having nicked the surface of the head, it shall be tested to breaking by the blows of a tup 648 lbs. weight falling 18 ft., and the fracture must show a combination of iron conforming to the aforesaid condition. 3. Each of the two halves of broken rail placed on two supports 3 ft. 8 in. apart shall be tested by the blows from a tup 648 lbs. falling 7 ft. on the center between the points of support. Under this test the rail may bend, but must not show any trace of destruction. The Vignoles section of rail would seem to have some advantage over the double headed, as the bottom flange is placed at a greater distance from the neutral axis, beside resisting side strains and torsions, and, as a matter of practice, none but ductile tough iron can be rolled into a wide flange.

GREAT NORTHERN TEST FOR BESSEMER STEE RAILS 80 LBS. PER YARD.

Rails to be taken from each day's rolling, and placed upon bearings 3 ft. apart, when a ball weighing 10 cwt. is to be raised 10 ft. and dropped three times, when the deflection must not exceed 3 in.

PILING IRON FOR ROLLING RAILS.

The rails for Indian States railways are specified to be "piled" as follows for rolling:

1. One slab 9 in. wide and 2½ in. thick for the top of the rail.

2. Five bars ¾ in. thick and 3½ in. wide, and 5 bars the same thickness, but 5½ in. wide, for the web of the rail.

3. Two L irons, 2½ in. wide on each side and ¾ in. thick, of one bar 4½ in. wide, and two bars 7½ in. wide, all three being ¾ in. thick for the flange of the rail.

Both slabs and bars must be run the full length of the pile. The bars for the web must be placed in five layers each, consisting of one 3½ in. and one 5½ in. bar, laid so as to break joint with the layer above and below it. The L bars for the flange must be placed at the edge of the pile with the vertical side outward, and the horizontal side upward bedded in the pile. The 4½ in. bar is to be placed between the edges of the horizontal sides, and 7½ in. bars between the vertical sides, so that the bottom of the pile will show a 7½ in. bar with an L iron edge on each side of it.

TESTING STEEL RAILWAY AXLES.

As is generally known, the mode of procedure usually adopted by continental railway engineers is to take one of each hundred axles and test it to destruction. It is usually stipulated in the specification that the whole lot may be rejected if this one, or at most a second, do not stand the trial, as several English makers have found to their cost. Some of these tests are very severe; such is that required by the Austrian Northern Railway, according to which all 5 in. steel axles, when set on supports nearly 5 ft. apart, must undergo blows from a weight of about 7 cwt., falling from a hight of nearly 19 ft., increased by 2 ft. from each successive blow. In this way it must withstand a bend of 9 in., the operation being continued until the axle has withstood more than six thousand foot pounds. A lighter test is that of the Southern Railway Company, who require for their 4½ in. steel axles that with a distance between the supports of nearly 5 ft., they shall withstand a bend of more than 9¾ in., under a 7 cwt. monkey, falling from a hight of nearly 15 ft. They must then allow themselves to be bent back straight in a same manner without breaking. In fact almost every other company's engineer has a different test, differing as to the distance between the supports, the weight of the monkey, and the hight of its fall.

TESTING OF FISH PLATES FOR RAILS.

1. Six fish plates to be taken at random from one day's rolling, and bent to angle of 60°, without any sign of fracture. 2. Holes to be punched at a distance from the edge equal to the diameter of hole without bulging the metal at the sides.

WEAKENING RAILS BY DRILLING AND PUNCHING.

The following experiment is mentioned by Aackney, in his "Manufacture of Steel." 1. A piece of rail with no holes in it stood a blow of one ton falling 20 ft. 2. A piece of the same rail with a punched hole through the web broke under the first blow at a 3 ft. fall. 3. A piece with a drilled hole the same size, while it stood the first blow at 2 ft. fall, broke with the second blow at a 4 ft. fall.

The following is a description of a box machine, which turns out boxes directly from the paper pulp. The inventor is from Sherbrook, Canada. The pulp, when prepared, is received into a hollow cylinder, where it assumes the box form; it passes thence into a press, where its whole interior and exterior surface is subjected to a pressure of four tons to the square inch. From the press it comes out firm and hard as the best cardboard, but still damp; it is put into a drying rack and completely dried; then it is carried to a finishing machine, which, by further pressure, finishes it in any desired style, plain or embossed. The latter process is executed by the machine without outside attendance, and does not add to the expense of the box. From the moment the pulp leaves the "pulping engine" to the moment when the box is ready to be dried the whole of the work is done automatically, without being touched by a workman's hand. In the whole operation of converting the pulp into the box ready for sale, only two boys or girls are employed—the one to arrange the damp boxes in the drying rack, the other to feed them to the finishing machine. Collar boxes, four inches in diameter, and two and a half inches in depth are turned out at the rate of three hundred and fifty an hour.

* This decision will be shown hereafter to be wrong as far as regards Krupp's boiler plates.

BUSINESS ITEMS.

VERMONT.

The puddling department of the rolling mill at St Albans has started up again, giving employment to about 50 more men.

The iron for the Burlington and Lamoille Railroad, some 3500 tons, has been purchased at Rome, N. Y., and is only waiting an opportunity for shipment; over 30,000 ties are now scattered along the road-bed, and 15,000 more will arrive at Burlington as soon as the lake opens. Three new locomotives—two for passenger and one for freight traffic—are being built at the Taunton (Mass.) Iron Works, and several passenger cars are already contracted for. The road-bed is nearly completed, all the sections, save two, being nearly ready for the iron.

MASSACHUSETTS.

Two locomotives, with 16 by 24 inch cylinders and 5 foot drivers, destined for the St. Paul and Sioux City Railroad, and a tank switching engine, 12 by 22 inch cylinders, for the Hartford, Providence and Fishkill Railroad (which was christened the "Fly") have been completed and forwarded by the Taunton Locomotive Works.

Currier's needle factory will, it is said, be removed from Melrose to Wakefield's brick block, Wakefield, immediately, as the necessary capital has been raised by the citizens for that purpose. The factory employs 75 hands.

The burned out tack company, at Northampton, have taken temporary quarters in the Sheffield foundries, to repair and build new machinery.

The John Russell Cutlery Co., at Turner's Falls will spend $5000 on their Centennial display.

The Rodney Hunt Machine Company, at Orange, are filling numerous Southern orders for their turbine water-wheels. The Chase Turbine Company will have some of their wheels working at the Centennial.

A machine shop and foundry is to be built at East Brookfield.

It is thought probable that the tack company at Florence will commence immediately to rebuild, probably on the site of the shops recently burned, and as soon as the necessary machinery can be obtained, resume the business of manufacturing.

The Florence Sewing Machine Company have commenced running on full time.

One hundred tons of iron have been sold by the Richmond Iron Company from their Cheshire Furnace, but the sale does not appreciably lower their pile of 5000 tons.

The roof of the Warren File Company's establishment, Holyoke, has been repaired, and the shafting damaged by the recent explosion put up.

NEW JERSEY.

Messrs. Fisher & Norris, Eagle Anvil Works, of Trenton, have just turned out the largest blacksmith's anvil in the world. The cast steel face is five feet in length, including the horn, and eight inches in width, it is welded in one piece to the body of the anvil. It weighs 1380 pounds, and is intended for a part of the firm's Centennial exhibit at Philadelphia. It is especially interesting from the fact that so large a piece of steel has never been welded to iron before either in this country or Europe. This firm manufacture a large variety of anvils, among which are many kinds for special purposes, as for saw makers and others. Many of these have hitherto only been made abroad, but are now produced by them equal to any of the foreign brands.

PENNSYLVANIA.

The National Locomotive Works, at Connellsville, are running full, and have plenty of work.

Mr. Wm. Strickler, of Connellsville, has an engagement with parties in Londonderry, Nova Scotia, to build 250 coke ovens and run them.

Jacobs & Jackson's Rolling Mill, at Brownsville, is running full.

The Allentown Rolling Mill suspended operations on Saturday, and for how long a time is not yet known. Some of the employes, who have been lying idle the greater part of a few years, contemplate going West shortly.—*Allentown Chronicle.*

There are at present 18 molders and 22 laborers employed at the Colebrockdale Iron Works, in Colebrookdale township, this county. The works are running on full time, and orders are coming in constantly. Business is brightening up, and the force of hands will be probably increased next month.—*Reading Times.*

SHENANGO VALLEY.

The Newcastle Iron Company, Bradley, Reis & Co., have had trouble with their sheet rollers. The company asked their men to work at Pittsburgh prices, which they refused, and a strike was the result. It was of short duration, and both sheet mills are running at the prices offered by the mill.

The rolling mill connected with the Shenango Iron Works, which was in operation last week, shut down on Saturday afternoon last, under circumstances depressingly cheerless. The "Old Mill," as it is called, is also at a standstill. As a consequence of this state of affairs, five hundred men, with families dependent upon them for support, are walking about our streets, seeking employment and finding none. —*Newcastle Guardian.*

The Sharon *Herald* disputes the assertion of the Sharpsville *Advertiser* that iron is lower than it has been for thirty years. The former says: "The Sharpsville *Advertiser* is in error in stating that 'iron is lower now than it has been for thirty years.' In 1857 gray forge stone coal iron brought $18 in Pittsburgh, and the highest price touched for No. 1 gray forge iron, made from stone coal, in 1857 was $20—four months' time."

On the 27th instant, the Pennsylvania Steel Company, at Harrisburgh, cast the largest steel ingot ever molded in this country, and equal to any made in England. The ingot is ten feet long, and has twenty-nine inches square section. Its solid contents is 100,000 cubical inches, and its weight 25,000 pounds. It will be sent to the Centennial Exhibition either in its present form, or will be forged into a shaft under the company's fourteen ton hammer. The largest product of steel rails ever made from one set of rolls was turned out by the company during the month of March, consisting of 5200 tons of finished product. The mill made its full number of turns during every working day in the month, but upon no day produced more than its regular number of bars.

The Beaver Falls Cutlery Company are manufacturing a monster knife and fork for the Centennial. The knife is nine feet five inches in length, and over a foot in width, with the Pennsylvana coat of arms in center of blade, guarded upon one side by William Penn, and upon the other by Governor Hartranft. They term the knife the Patent Carver; its weight is 130 pounds. The fork is six feet four inches in length, and weighs 100 pounds. Both knife and fork are finished in the finest style of art, the handles are of solid ivory, and the cost of the two is over $1200. The show case in which these giants are to be exhibited will cost in the neighborhood of $800. Knife and fork will be finished in the most superb style, by accomplished artists. The work was designed by B. S. Pugh, one of the employes of the company, a skillful and talented mechanic. Aside from this the company will have on exhibition a revolving knife, supplied with 365 blades—one for each day in the year. The motive power of this revolver is clock-work. Surmounting this elegant and artistic piece of workmanship are two finely carved ivory swans.

PITTSBURGH AND VICINITY.

The spike mill of Dilworth, Parker & Co., on the South Side, is idle.

The following is a statement of the coal and coke shipped from the various pools of the Monongahela River to Pittsburgh for the month of March. By comparing it with former years the run during the month is shown to be one of the largest since the Monongahela Improvement was constructed. The bushel is 76 lbs.:

	Bushels.
Pool No. 1	1,325,500
Pool No. 2	6,428,400
Pool No. 3	2,401,300
Pool No. 4	2,722,500
Total	12,877,700

The coke shipped from Pool No. 2 aggregated 698,700 bushels.

The first piece of machinery in place in the Machinery Hall, at the Centennial, is a light locomotive, built by Messrs. Porter, Bell & Co., of this city.

Both the Shoenberger furnaces are in blast, one running on Bessemer on orders for the Edgar Thompson Steel Works, making from 30 to 33 tons a day. The other is on forge, making about 35 tons.

All the window glass manufacturers on the South Side are in operation.

In 1826 there were only 6000 boxes of glass made in Pittsburgh.

The manufacture of glass in this city was commenced in 1796.

McConway, Torley & Co. are building an addition to their Malleable Iron Foundry, on Liberty street.

The steel for the monster knife and fork being manufactured by the Beaver Falls Cutlery Co. was made by Messrs. Able & Pedder, of the same place.

The Keystone Bridge Co. are running full time full force.

The Eagle Mill, Mullen & Maloney, the old Wood's Mill, has 31 boiling furnaces, 14 heating, 2 muck trains, 20 in.; a 16 in. bar, 20 in. nail plate, 8 and 10 in. guide and a 3 high bar, together with 42 nail machines. They are running on bars only, working 17 puddling furnaces single turn. No use is made at present of the nail mill.

The Soho Furnace, Moorhead, McClean & Co., went out of blast last week, having used up all the stock on hand, and being obliged to wait the opening of navigation for more. The furnace has some 6000 tons of pig on the bank, and will probably not blow in again at present unless there is some reduction in the price of ore below that of last year.

The Scottdale Rolling Mill is running double turn. The furnace is making about 45 tons per day of neutral iron out of one-fifth Lake and four-fifths native ore.

WEST VIRGINIA.

The Ohio Valley Mill, at Moundsville, is again idle, and no immediate prospect of starting.

The burning of the Benwood Works, at Wheeling, resulted in the destruction of a large amount of finished stock. The nails burned were about 10,000 kegs of fine three-penny, about 12,000 kegs of common three-penny, and the remainder casing, fence, clinch, barrel, seven-penny, six-penny common, four-penny common, finishing nails, six-inch and four-inch common spikes, boat-spikes, etc. The whole stock of nails was valued at about $60,000. Of the furnace stacks there remain about twenty-seven, three of which are leaning considerably. One of these stacks fell during the fire. The large boilers are not materially injured. The wooden arms of two of the three big fly-wheels were destroyed, together with the three pitmans. The engines are evidently badly damaged, but the rolls appear to be unhurt. The squeezers are apparently as good as ever, and the boiling furnaces do not seem to be injured greatly. Those of the boiling furnaces in which balls were left, however, will probably have to be torn down and rebuilt. There were one hundred and twelve nail machines in the factory, and, as the floors gave way, the most of them fell into the cellar. As yet, of course, it is impossible to tell in what condition they have been left. The iron part of the ore crusher is not materially injured, but the shearing machinery is considerably bent up.

OHIO.

The furnace of the Akron Iron Company is out of blast, and has been out for over two years, the proprietors not seeing any advantage in making iron at present prices, prefering to buy iron for their mill.

The last of the Brier Hill furnaces has gone out of blast.

The lining of stack No. 1 Himrod Furnace, Youngstown, is completed, and the hearth and bosh will soon be finished, when it will again blow in.

Girard Mill is in full operation.

All the mills in Cincinnati and vicinity are running single turn. Swift's is running 8 furnaces, and the Globe about half.

Swift's Iron & Steel Co., Cincinnati, have lately added to their extensive works a department for the manufacture of Chrome steel. The milling is done in coke holes, of which they have twelve. As yet their production has been confined to safe steel, mostly for the local safe establishments.

The Belfont Mill, at Ironton, started last week, Tuesday. The furnace will go in Tuesday of this week.

The Girard Wrench Factory last week received an order for a quantity of wrenches from a hardware dealer in England.

Gaylord's Mill, at Portsmouth, are running 12 furnaces. The Burgess Steel Works is run to its full capacity.

Zanesville is running full double turn.

Cuyahoga Falls has a new industry in the shape of a rivet manufactory. The Falls Rivet Co. is the title of the firm. They produce about a ton and a half a day on an average of Norway iron rivets, employing from 12 to 20 hands. They report orders ahead for over 100 tons. They are at present working on an order for 20 tons of fine tinned wire for an Eastern house.

The mill at Pomeroy is running single turn. It was stopped a few days for ore. It is a merchant mill, but has some nail machines which it will probably sell.

The Enterprise Machine Company is a recent addition to the manufacturing industries of Cleveland. The company is composed of practical mechanics, and their works are well supplied with machinery for the manufacture of machinists' tools, pulleys, shafting, hangers, barrel machinery and gear cutting.

MISSOURI.

The only merchant iron mills in St. Louis in operation are the La Clede and Helmbacher. The former is running double turn full, and the latter about half single turn.

MICHIGAN.

The Ward Furnace, at Wyandotte, is out of blast. The Eureka is blowing.

The Leland Furnace is out of blast.

The Wyandotte Rolling Mill is in operation, and is the only rolling mill in the State working at present.

All the furnaces at Detroit are out of blast.

KENTUCKY.

A bridge in this State, on the Cincinnati Southern Road, will be, when completed, the highest bridge in the world, the hight of it being 272 feet, all of which, except 65 feet, being of iron.

TENNESSEE.

The Southern Iron and Coal Mining Company have christened the city that is to grow at Battle Creek, South Pittsburgh, and the mail for the company so directed comes through all right. And why should it not? Where would there be another Pittsburgh except in East Tennessee.—*Chattanooga Commercial.*

ILLINOIS.

The Jos. H. Brown Iron and Steel Co., of Chicago, are nearly ready to begin operations in their merchant mill. All finishing trains, except the 22 inch beam mill, are ready to operate, except making steam connections. The puddling and heating furnaces are ready to work, and the boilers are in place. The bar mill and 9 inch train are in position, as well as the top and bottom mill. They are building a blast furnace 18x80. This will be, when completed, one of the most complete establishments in the West. It has 6 double puddling furnaces (Siemens), with a daily capacity of 8 tons each on double turn; 2 scrap furnaces (Siemens), with a capacity of 20 tons each per day, and 5 Siemens' heating furnaces, 32 gas producers, a 22 inch beam mill to roll 90 feet long; 16 inch bar with six stands of rolls, 9 inch guide; 20 inches top and bottom mill, 20 inch muck train; all three high; 16 40 inch boilers, with 40 3 inch flues in each. They also have drawings for a complete Bessemer plant.

INDIANA.

The mill at Aurora is running double turn. It is a small mill, making principally sheet iron.

New Albany Iron and Nail Works is doing but little. The rail mill was to have started Monday, but we learn there will be no puddling done. The Louisville and Nashville Railroad Company has contracted with the mill for 1000 tons of rails for that road. This will keep the mill running some time.

The Rumser Furnace, at Knightsville, which has been making iron from furnace slag, will be compelled to stop operations this month on account of scarcity of slag.

Both stacks of the Vigo Furnace are out; both out at Knightsville, and the Brazil in.

WISCONSIN.

One of the blast furnaces of the Milwaukee Iron Co. is in blast. The other is banked up, waiting the opening of navigation to receive a supply of ore.

The Minerva Furnace, at Milwaukee, has not been in blast for two years.

PACIFIC COAST.

A very heavy casting was made at the Pacific Iron Works this week, in the shape of the large cylinder for a compound engine, which is being built for the pumping machinery of the Savage mine, on the Comstock. The cylinder is 48 inch bore and 8 feet stroke, weighing 16 tons. The engine is a compound one, with the Davy differential valve gear, worked by an independent cylinder. With this machinery goes a line of 13 inch pumps and two sets of pump bobs, the pump column reaching to the 2200 foot level of the mine.—*Scientific Press.*

Sheffield Cutlery at the Centennial.

Our Sheffield correspondent sends us detailed accounts from the local papers of the various exhibits which are ready for the exhibition. We condense from them the following:

Messrs. James Burnand & Co., cutlery manufacturers, Leicester Works, Leicester street, have secured 24 square feet of space. While other firms have been preparing goods specially for the exhibition, Messrs. Burnand & Co. have simply collected a number of their articles made during the last few years, and arranged them tastefully in a show-case. The collection includes butchers' knives, South American daggers and hunting knives in great variety, hunting knives for Russia and Norway (with the single guard), table and desert cutlery, nut picks, &c. Many of these goods are very superior specimens of their class, the workmanship of the blade being not only honest and sound, but the handles ornamented with much taste and beauty. The dagger and hunting knives in black horn, pale horn, ornamented with green perrl, and others in silver and chased, with carved ivory handles, are specially noticeable. The firm show a number of presentation hunting knives, "and thereby hangs a tale." They were intended, and were specially manufactured for the purpose of being presented to those Ashantee chiefs and others who had rendered service to our troops in that memorable little war. At the last moment the idea was abandoned, and the knives remained at Leicester street. They are made in solid silver, the handles being in rich metal with Louis Grand scroll. One knife in the center of the case has a very artistically carved ivory handle, and is itself exquisitely finished. A Scotch dagger, specially made for a Highland regiment, with a long list of their engagements engraved on the blade; a Freemason's sword, emblematical of the craft, with rich ormulu handle; a dagger knife, with the handle in rich metal, gilt, wrought in the design of an Indian.

The Hardy Patent Pick Company, limited, of the Mining Tool Works, Ecclesall Road, have recently had on exhibition a collection of their manufactures, which they had specially prepared for the Philadelphia Exhibition. The *Telegraph* remarks in regard to this, that "with the majority of people, the prevalent idea is that 'a pick's a pick,' and there is nothing more to be said about it. Those who visited the works, however, found that they had a good deal to learn in the specialty of picks. Some six or seven years ago Mr. Hardy came over from America, and with him he brought a Yankee notion which may be said to have fairly revolutionized the pick trade." The old wooden shaft, with the blade fastened in the wood by wedges, is abandoned. The present styles are the "Acme," the "Universal" and the "Hold-fast," all of which are made on what is known as the interchangeable principle. Many varieties of picks used in mines, on railways and other quarters were displayed. Under the old system a miner, when he descended the pit, would require to take with him 15 or 20 picks, shafts and blades complete. Under the new system he takes down one pick and three or four blades. The patented device is a safe and simple means of holding the head so that it may be easily removed and replaced by another. The "Universal" is used for almost every purpose, and capable of carrying blades of 2 lbs. to 20 lbs. The "Hold-fast" differs from the "Universal" in the specialty that the blade goes over the head of the shaft instead of the small end. Track layers' picks, grubbing hoes, ordinary mattocks, pole picks, and every description of light mining and heavy navvy tools, are included in the collection. The company will also show Emerson Bainbridge's lubricator, for oiling the wheels of coal corves. Mr. Bainbridge has also invented a safety lamp, which the company will exhibit. It is constructed of brass, and has a large glass surface near the light, by which the inventor claims to obtain a better light than in any other safety lamp at present in use. The company will also show a quantity of stemming gear for colliery works, including prickers, rammers, scrapers, &c. These are constructed of copper, in accordance with the requirements of the Mines Regulation Act, as copper cannot strike fire. The Walker patent safety detaching hook will also be shown. By this invention the dangers of over-winding are obviated. The space in the Exhibition secured by the company is 10 feet to the front and 25 deep.

Messrs. Marris & Norton's, Bull street, Birmingham, have on exhibition a very large and most elaborately fitted show case intended for the International Exhibition. It has been specially constructed for the exhibition of specimens of the needle and fish hook trade of Redditch. The exhibitors, Messrs. Milward & Sons, are well known throughout the world amongst the largest and formost manufacturers of these articles, and this case will convey some idea of the vast extent of the trade. It is in itself a miniature exhibition, for it includes specimens of needles of every description arranged in the center of the case, and in each of the panels there is a display of fish hooks, with flies, glass and metal baits, &c. Below the panels there is a long horizontal case, in which are exhibited a great variety of needle cases, crotchet hooks, &c. Messrs. Milward & Sons have previously taken a prominent part in other International Exhibitions, and they hold medals for the excellence of their manufactures from London, Paris, Vienna, &c., but this case of specimens is larger and more important than any which they have previously shown. It is a contribution which will certainly do honor to the district, and reflects the highest credit upon the works of Messrs. Milward & Sons. The case has been specially manufactured by Messrs. Marris & Norton, and is of the most elaborate character. It has been built in the Italian style, and is of ebony, richly ornamented with gold. The names of Messrs. Milward & Sons and their American agents appear in gold letters over the center and panels, and *fac-similes* of the medals the firm have previously received are also shown. The whole is surmounted with a very artistic display of silk flags, including those of England, America, Brazil, Germany, France and Italy, which have been specially manufactured for the case by Messrs. Legg & Co., of Bromsgrove street.

Messrs. Chamberlain, King and Jones, of Union street, Birmingham, have on exhibition a magnificent show case filled with needles, fish hooks, &c., which have been especially manufactured by Messrs. James Smith & Son, of Astwood Bank, near Redditch, for the exhibition. The needles are very artistically displayed, and they form a most interesting collection, showing specimens of every possible variety of needle from the tiniest little things which one would suppose were for use only by the most juvenile of dolls' dressmakers, to the monster needles required by sailmakers. Then there are needles for sewing machines, and for all the varieties of work now done by these machines; crotchet needles in every style and of every size; packing needles of all sorts; and most curious, perhaps, of all, every description of needle required in surgical operations. Few who have not seen such a collection as this case contains could form the least idea of the immense variety of needles now constantly manufactured by them. The case in which these needles are to be exhibited has been specially manufactured for the purpose by Messrs. Chamberlain, King & Jones, and it is a very beautiful and costly piece of cabinet work, having somewhat the appearance of an elegant bookcase and chiffoniere. It is of the finest English walnut, with a projecting frame supported by massive twisted brass pillars, and the panels are glazed with the finest plate glass.

The American Steamship Company.

The question whether the attempt to maintain a steam service between Philadelphia and Liverpool has been attended with a measure of financial success great enough to encourage similar undertakings in other seaboard cities, is one of much interest, and we find it answered in the report of the company for 1875, presented at the meeting of the stockholders in Philadelphia a few days ago.

It shows the receipts to have been—from freight, $791,138·59; passengers, $288,309·14; miscellaneous, $1,872·29; a total of $1,081,320·02. The disbursements for ordinary operating expenses were $886,258·89, leaving the excess of receipts over ordinary expenses of operating at $195,061·13.

The expenses of agencies, etc., were $87,289·87; advertising, $29,050·04; wharf expenses, $10,225·82; a total of $126,565·73, showing a gain of $68,495·40. The extraordinary repairs and expenses of steamers were $38,033·40, leaving a net gain of $30,462 for 1876. The operations of 1874 resulted in a loss of $48,914·26, so that the gain for 1875 is equivalent to a gain of $79,376·36.

The supply account shows the value of material on hand January 1, 1876, to be $17,269·01.

The report further states:

The balance remaining in the hands of the general agents January 1, 1876, was $30,823·92; which since that date has been drawn from them, and the only outstanding indebtedness of the company, other than that due the Pennsylvania Railroad Company, paid off.

The commercial depression existing in 1874 has continued with increased severity, and the receipts from the steamers from all sources in 1875 show a decrease from those of the previous year of over $700 per voyage, the falling off being in the receipts for passengers, the number carried being 1206 less than in 1874, although the rates received were considerably higher.

We might have expected a far greater diminution in the number of passengers carried, as official statistics show that the immigration was 50 per cent. less in 1875 than in the previous year.

At the same time the expenses have been materially reduced, showing an average reduction per voyage of nearly $3300, and to this fact alone—the result of the efficient and economical management at Philadelphia and Liverpool, seconded by the commanders of the steamers—is attributable the favorable exhibit of the year's business.

The commanders have positive instructions never to incur any risk to accomplish a rapid passage, and while many instances exist of exceptionally rapid trips by steamers of our competitors, we may well be satisfied with the regularity of the departures and arrivals during the past year; the average time, without allowance for stoppages, of outward passages of the four steamers having been 9 days, 20 hours, 5 minutes, and of inward passages, 10 days, 20 hours, 18 minutes.

For the first six months of the year the operations showed a loss of $46,305·25. In the succeeding six months the gain on the operations was $76,767·25.

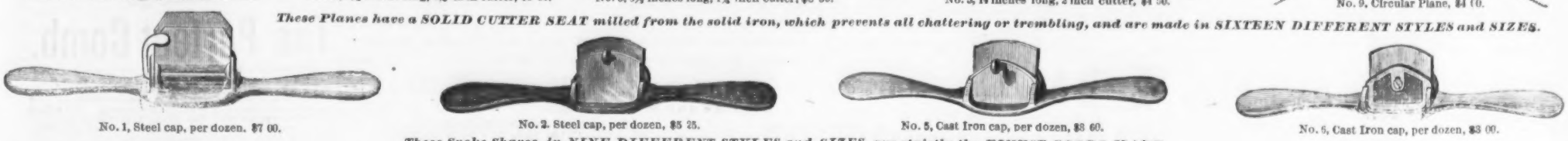
The gain for the year, $30,462, is without the interest on the bonded debt of the company, which has been met by the Pennsylvania Railroad Company.

The treasurer's report was read, the debtor side of which showed capital stock, $701,400; mortgage bonds, $1500; bills payable, $465,683·46; profit and loss, $96,407·75—a total of $2,763,491·21. The credit side showed: Coupon account interest on bonds, $346,350; advances for the operation of the steamers and purchase of supplies, $66,545·19; construction and outfit, $2,349,006·02; leaving cash on hand, $1590. The cost of construction and outfit on the different steamers was: Pennsylvania, $585,518·95; Ohio, $589,367·54; Indiana, $582,317·17; Illinois, $586,802·46.

Defiance Metallic Bench Planes, Spoke Shaves, Box Scrapers, Etc.

No. B, 7½ inches long, 1¾ inch cutter, 75c. No. E, 6½ inches long, 1¾ inch cutter, $1 50. No. 3, 8½ inches long, 1¾ inch cutter, $3 50. No. 5, 14 inches long, 2 inch cutter, $4 50. No. 9, Circular Plane, $4 00.

These Planes have a SOLID CUTTER SEAT milled from the solid iron, which prevents all chattering or trembling, and are made in SIXTEEN DIFFERENT STYLES and SIZES.



No. 1, Steel cap, per dozen, $7 00. No. 2, Steel cap, per dozen, $5 25. No. 5, Cast Iron cap, per dozen, $3 60. No. 6, Cast Iron cap, per dozen, $3 00.

These Spoke Shaves, in NINE DIFFERENT STYLES and SIZES, are strictly the FINEST GOODS MADE.

No. 9, Steel cap, per dozen, $6 00. No 1, Box Scraper, per dozen, $6 00. No. 4, Box Scraper, per dozen, $10 20. Defiance Plane Irons, Warranted.

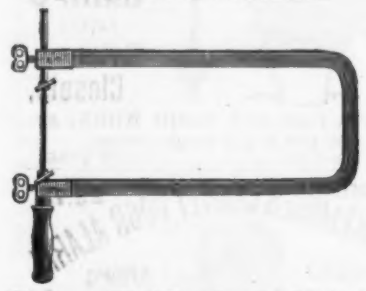
The Defiance Box Scrapers are in use at H. B. Claflin & Co.'s, A. T. Stewart & Co.'s, and other large shipping houses, who have adopted them in preference to all others.

☞ Send for Descriptive Circular.

BAILEY WRINGING MACHINE CO., Sole Agents, 106 Chambers St., N. Y.

MILLERS FALLS CO., 78 Beekman St., N. Y.

Spring Steel.—Rosewood Handle.



This frame will hold Saws from 2 to 5 inches in length, and face them in any direction.

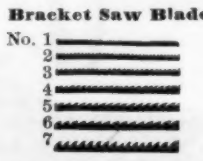
8 inch, each	$1·10
10 " "	1·20
12 " "	1·30
14 " "	1·40

Soldering Casket.

Soldering Iron, Scraper, Bar of Solder and Box of Rosin.
Put up in a nice box. Price, per dozen, $6·00.

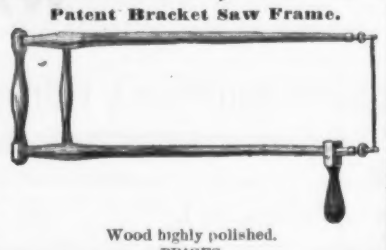
The Bracket Saw trade is now forcing itself upon the attention of all Hardware Dealers, as we have advertised our goods in every part of the country, and given notice that they could be had at the hardware stores at our lowest prices. Any dealer who buys these goods on our recommendation may return them if he finds them in any way defective or not suited to his market. On these conditions not one saw will be returned, but the succeeding orders will be larger than the first.

Bracket Saw Blades.



Price, per dozen, 25 cents.

Patent Bracket Saw Frame.



Wood highly polished.
PRICES.
12 and 14 inch Rosewood, each ..... $1·25
12 and 14 inch Birch, " ..... 1·00

Carving Tools.

Gouge, Chisel & Parting Tool. Price, ₰ set, $1·00.
These Tools are put up three in a box, with Apple Wood handles, and nicely fitted for use. They are equal to imported tools, and sell at a lower price. **Large Discount to Dealers.**

THE EAGLE ANVIL !!WARRANTED!!

(ESTABLISHED) 1843.

These Anvils are *superior* to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage, that being of a more *solid* material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a *hammer one-fifth lighter* than that required when using a wrought iron anvil.

The working surface is in *one piece* of JESSUP'S BEST TOOL CAST STEEL, which, being accurately ground, is hardened and given the proper temper for the heaviest work. The *horn* is covered with and its extremity made *entirely of steel*. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is *warranted to be thoroughly welded and not to come off*.

☞ **NEW PRICE LIST.** ANVILS of 100 lbs. to 600 lbs., 10c. per lb.

Small Anvils, ("Minims.")

	No. 00	0	1	2	3	4	5	6	7	8	9
Weighing about	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.	
	$2·50	$3·20	$3·75	$4·50	$5·00	$5·90	$6·75	$7·25	$8·10	$9·00	$9·50

THESE GOODS ARE SOLD BY THE GENERAL AGENTS (with special discounts to the trade).

New York.—Messrs. J. CLARK WILSON & CO.—RUSSELL & ERWIN MFG. CO.—Messrs. HORACE DURRIE & CO. Boston.—Messrs. GEORGE H. GRAY & DANFORTH. Philadelphia.—Messrs. JAMES C. HAND & CO. Baltimore.—Mr. W. H. COLE. Louisville.—Messrs. W. B. BELKNAP & CO.

FISHER & NORRIS, Sole Manufacturers, Trenton, N. J.

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SAMSON WRENCH.

It is the only Wrench that will hold *Gas or Steam Pipe, Gas Burners, Round Iron or Steel* without slipping. Samples sent to the trade only, on receipt of fifty cents and business card.

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HOWARD PARALLEL BENCH VISE.

STAFFORD MANUFACTURING CO.'S
Stencil Combinations.

Containing: Stencil Alphabet, Figures, Can Stencil Ink and Brush.

For marking boxes, barrels, bags, and packages for shipment. Printing all manner of showcards, notices, signs, numbers, prices, &c., and other purposes too numerous to mention. Instructive and amusing for boys.

WHOLESALE PRICES.

Size.		Size.	
½ in., per dozen	$6·00	1⅛ in., per dozen	$10·00
¾ " "	6·50	2 " "	12·00
1 " "	7·00	2½ " "	18·00
1¼ " "	9·00	1⅝ " with lower case	15·00

An Illustration of sizes sent on application.

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No. 66 Fulton Street, New York.

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HARDWARE CO.,
New Haven, Conn.

ESTABLISHED 1830.

Manufacturers of

BUILDERS' HARDWARE, BUTTS, HOUSE TRIMMINGS, CARRIAGE,
And GENERAL HARDWARE

The attention of our old Customers and the Trade generally is invited to our new Illustrated Catalogue just issued, comprising a full assortment of our well known staple goods: **Butts** (Drilled and Wire jointed), Thumb Latches, Sash, Upright Screw and Side Pulleys, Wardrobe and Harness Hooks, Draw Pulls, Nut Crackers, Cork Screws, &c., &c. Also several new and attractive styles of Fancy Hardware, **at prices to suit the times.**

Our new Patent Fancy Open Work Cap Butt, with Ornamented Knuckle, in Real and Imitation Bronze, and our Nickel Plated Cap Butts, with concealed Screws, are the handsomest in the market, and are attracting much attention. While making plain and japanned goods a specialty, we are prepared to meet the increasing demand for ornamented bronze and nickel plated House Trimmings. Goods packed in boxes or bundles, as may be preferred. For catalogue and price list address

BLAKE BROTHERS HARDWARE CO.,
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ZERO

Refrigerator
WITH
Wate Wine & Milk
COOLER.

The Best Food and Ice Keeper in the world.

Grand Award of American Institute, 1867, 1869, 1871 and 1875.

35,000 in Use.

Send for Catalogue. Trade Supplied.

ALEX. M. LESLEY
Manufacturer,
226 W. 23d St., N. Y.

IRON BLOCK PLANE.

No. 110. 7 1-2 Inches Long, 1 3-4 Inch Cutter, $9·00 per dozen.

STANLEY RULE AND LEVEL COMPANY, Manufacturers,
Factories, New Britain, Conn. Warerooms, 35 Chambers St., N. Y.

Forehand & Wadsworth's Double-Action

WROUGHT IRON FRAME.
Cast Steel Barrel and Cylinder.
32, 38 and 41 Cal.

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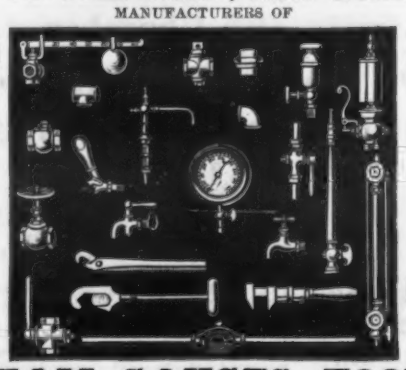
Wrought Iron **PIPE,** Cast Iron **FLANGED PIPE,** **Cast Iron** RADIATORS and BOILERS.



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STEAM GAUGES, TOOLS,
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THE SELDEN DIRECT-ACTING
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PAT. AUG. 2, 1870. DECEMBER 20, 1870
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COMBINING SIMPLICITY AND DURABILITY TO A REMARKABLE DEGREE. IT'S PARTS ARE EASY OF ACCESS AND IT IS ADAPTED TO ALL PURPOSES FOR WHICH STEAM PUMPS ARE USED
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The Atlantic White Lead and Linseed Oil Company,
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WROUGHT IRON INDESTRUCTIBLE ENAMELED PIPE

For Water, Gas, Sewage & Soil Pipe.

Manufactured Solely by

NATIONAL TUBE WORKS CO.,

Also Lap Welded Steam & Gas Pipe & Boiler Tubes.

Tubing & Casing for Artesian, Oil & Salt Wells (with Patent Protecting Coupling),

A Specialty made of Large Wrought Iron Lap Welded Tubes, 8 in. to 14 in. diameter.

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MADE ENTIRELY OF SOLID CAST STEEL.
Cuts Wrought Iron, Brass and Copper Pipes, Round Iron &c perfectly true without leaving burr on pipe, contracting or splitting it. Cuts out a chip similar to a lathe tool. The knife may be removed and ground. Send for descriptive circular to manufacturers.
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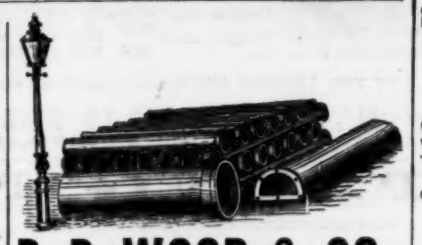
I sell my Carriage Ornaments to dealers only.



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FOR WATER AND GAS.

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

The Perfect Comb.

We call your attention specially to our new patent endless wire frame comb. The result of a long series of experiments, made with a view to meeting all the requirements of a *Perfect Comb*. It is better, stronger, and more durable than any ever before invented. The raised wire shank gives what has never before been attained, viz: a rest and brace for the thumb, in such a position that the hand cannot come in contact with the horse while using the comb. The wire braces which run from the shank over the back to the front teeth give strength and durability in a direction never heretofore attained, and at the same time serve as an extra handle; and when clasped by the fingers in connection with the raised shank the comb is more firmly, easily, and completely held, and with much less fatigue to the hand than is possible in any other formation—in short, it needs but a trial to vindicate a name: **The Perfect Comb.**

THE LAWRENCE COMB CO.
Factory and Office,
382 2d Ave., cor. 22d St., N. Y.

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Sole Manufacturers of
CARR'S PATENT **Water Closets,**
PUMPS, CABINET WOOD WORK, &c.
106, 108 & 110 Centre Street,
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EDWARD BARR,

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Tubes for Gas, Steam & Water

1-16 to 48 inch. **Gas, Steam Fitters', Plumbers' and Machinists' Supplies.** Boiler Tubes, Iron and Steel Boiler Plates, Rivets, Tools, Etc. Railroad Cars and all kinds of Railway Supplies. Iron and Wood Work for Cars, Bridges and Buildings.

Agent for W. C. ALLISON & SONS.

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WHEATCROFT'S SELF-ADJUSTING

Pipe Wrench,

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MACHINE OILERS.

Dealers in

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SCALES

SCALE AND TESTING MACHINE WORKS

PHILADA ESTABLISHED 1848

"Patented" Furnace Charging Scale.

Double Beam R. R. Track Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales. Testing Machines any capacity.

Send for Illustrated Price List.

GOLD MEDAL

Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER & SON, Manufacturer,

Badger Place, Charlestown, Mass.

The National Steel Tube Cleaner.

Patented July 28, 1874.

Guaranteed to clean better, last longer and work easier than any in the market. Removes all Carbon and Scale from the Boiler Tubes. Adopted and in use by United States Navy. For sale by dealers.

THE CHALMERS SPENCE CO., Foot East 9th St., N. Y., Agents for the United States.

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Nuts, Bolts, etc., *Makers of.*
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Fuller, Lord & Co., 139 Greenwich, N. Y. 4
Haskell W. H. & Co., Pawtucket, R. I. 13
Lewis, Oliver & Phillips, Pittsburgh, Pa. 13
Roseberry Geo. D., Pottsville, Pa. 4
Russell, Birdsall & Ward, Port Chester, N. Y. 40
Shelton Co., Birmingham, Conn. 34
Sternbergen J. H., Reading, Pa. 13
Union Nut Co., 78 Beekman N. Y. 28
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Riessner A., 160 William, N. Y. 10
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Lester Oil Co., 185 Water, N. Y. 31
Old Iron, etc.
Gregg H. L. & Co., 108 Walnut, Philadelphia. 5
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Blake Crusher Co., New Haven Ct. 38
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Howson & Son, Phila. and Washington, D. C. 28
Lehmann F. A. Washington, D. C. 28
Munn & Co., *Scientific American* 37 Park Row N. Y. 37
Nye Francis C., 13 Murray, N. Y. 26
Simonds W. E., Hartford, Ct. 36
Spencer A. H., 28 State Boston, Mass. 28
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Meyer Henry C. & Co., 48 Cliff, N. Y. 40
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Pancoast & Manie, 227 Pear, Phila. 26
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Leighton Bridge and Iron Works, Rochester, N. Y. 16
McNeal John & Sons, Burlington, N. J. 6
National Tube Works Co., 78 William, N. Y. 28
Warren Foundry & Mach. Co., Phillipsburg, N. J. 35
Wood R. D. & Co., 400 Chesnut, Phila. 36
Plane Irons, *Manufacturer of*
Buck Bros., Millbury, Mass. 3
Mack & Co., Rochester, N. Y. 18
Middletown Tool Co., 18 & 20 Cliff, N. Y. 6
Planes, *Manufacturers of*
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Greenfield Tool Co., Greenfield, Mass. 10
Mack & Co., Rochester, N. Y. 18
Stanley Rule & Level Co., 85 Chambers, N. Y. 25
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Derby Silver Co., Derby, Ct. 40
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Plumbers' Materials, *Manufacturers of*
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Redfield, Bowen & Walworth Co., Chicago, Ill. 40
Carr Wm. S. & Co. 106 Centre, N. Y. 26
Power Hammers. *Makers of*
Forsaith S. C. & Co., Manchester, N. H. 36
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Merriman A. R., West Meriden, Ct. 34
The Stiles & Parker Press Co., Middletown, Ct. 39
Peck Milo, New Haven, Conn. 38
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Kelsey & Co., Meriden, Conn. 40
Pumps. *Makers of.*
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Douglas W. & B., Middletown Conn. 7
Rumsey & Co., Seneca Falls, N. Y. 7
Union Mfg. Co., 99 Chambers, N. Y. 7
Pyrometers.
Brown Edward, 311 Walnut, Phila.
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Metcalf, Paul & Co., Pittsburgh, Pa. 37
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Cambria Iron Co., Johnstown, Pa. 5
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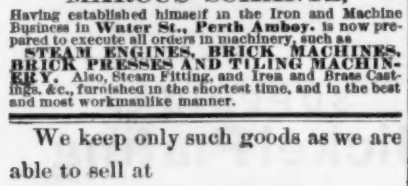

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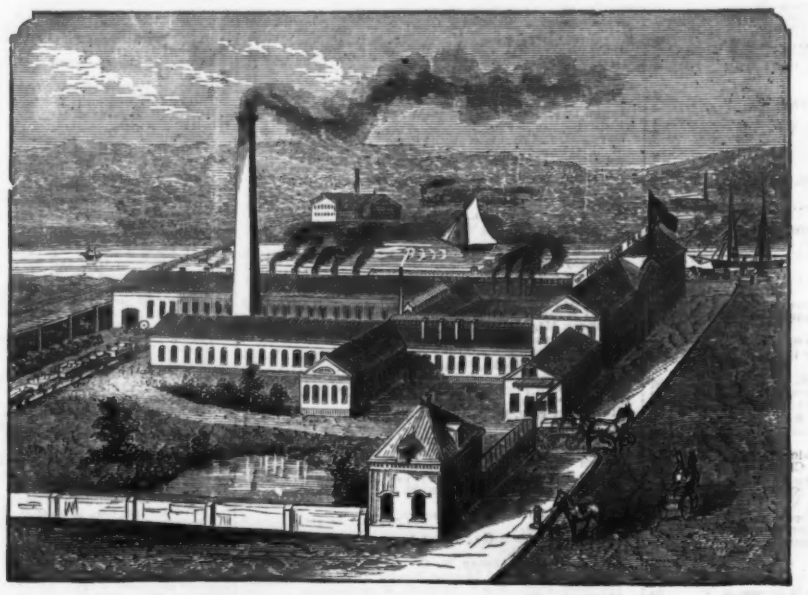

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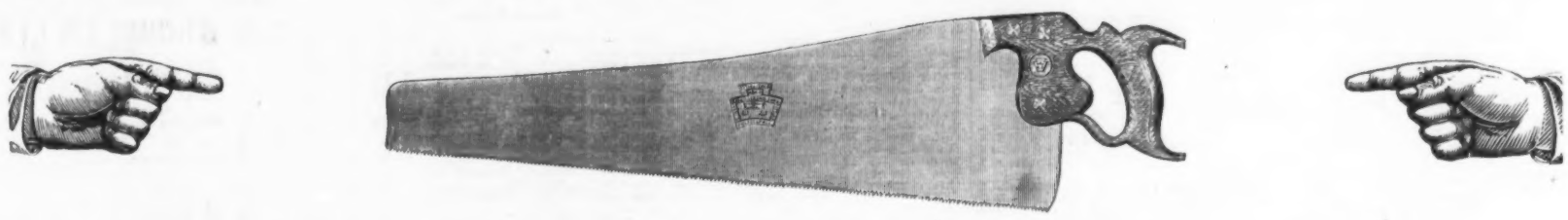
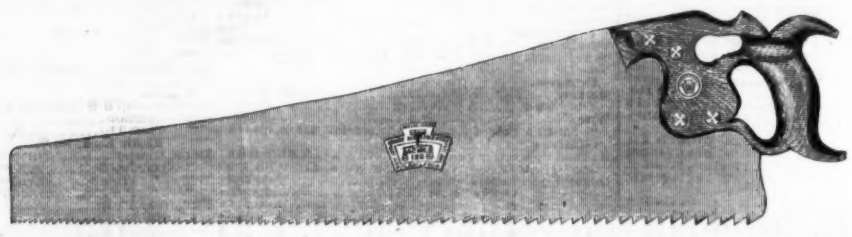
"CENTENNIAL No. 76."



This Saw is ground on the back, to taper gradually from butt to point, being only 26 gauge at the point. By this mode of grinding, the Saw, when tested, makes a complete "whip bend." The handle is apple-wood, oil finish, the screws are flush and polished, and the Saw is superior to any ever offered to the trade in this or any other country at the price. It is the sweetest-cutting, nicest-hanging Saw that can possibly be manufactured, feeling as light as a feather at the point, owing to its peculiar construction. The screws are finished before being put into the handle, and, should they become loose, can be readily tightened with an ordinary screw-driver, and still make a good finish.

ACME No. 120.



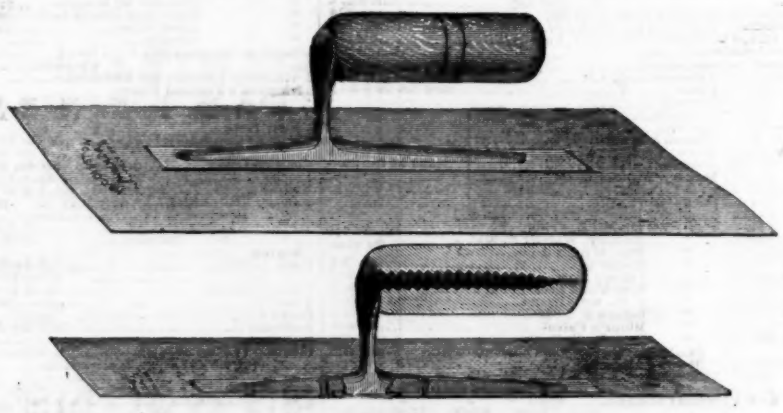
We present to the trade this week a cut and description of our Acme Saw No. 120. This Saw combines all the valuable improvements in Hand Saws that have been made by us of late.

The first and most important improvement is the hollow or skew-back, the success of which can best be attested by the number of these Saws that has been sold this month—two hundred and sixty-three dozen have been ordered since March 1st by letter, as our stock orders for the spring trade were nearly all in before that date.

The No. 76 formed the bulk of these orders, but the fact of the above number of the Skew-Backs having been sold in three weeks, taking into consideration the depression of business, is sufficient to prove that it is bound to supersede all other saws.

The peculiar shape of the butt or heel of this Saw (No. 120), coupled with the new method of fastening to the handle, gives a full stroke of the blade without fear of catching or hooking in the work; and as the handle is put further on the blade you have a full stop at the proper point, and a greater command over your saw, by reason of being two inches nearer to the point which must give more power. The new handle is complete, and so constructed that it makes the easiest feeling handle imaginable, and one that will not wear hard places on the hand.

The saw being let into the handle on a circle has a perfect bearing, which, with the new screws, makes it stronger and almost impossible to work loose, and avoids the unsightly gap that is seen on the back of the old style handle. All the above features are patented.

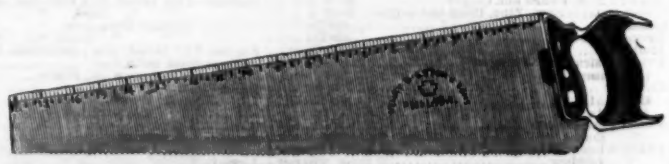


SECTIONAL VIEW.

PLASTERERS' TROWELS.

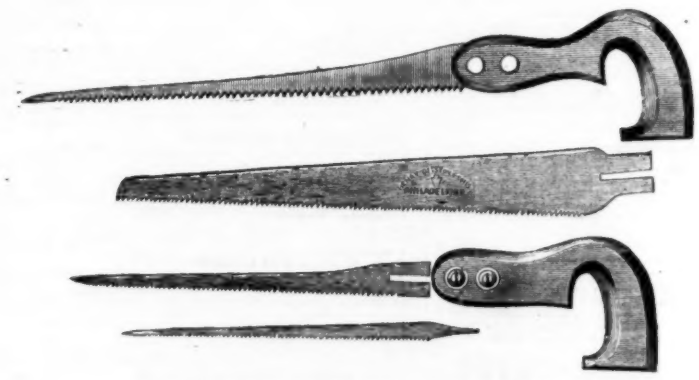
The attention of Plasterers is called to the above cuts of our new Plastering Trowel No. 0, for which we have received Letters Patent of the United States, dated April 20, 1875.

We warrant this Trowel to be superior to any other in the market, and guarantee it to give entire satisfaction. Our improvement consists in making a Plastering Trowel with a central longitudinal rib, giving thereby additional strength and at the same time allowing the use of rivets with larger heads, thus securing the mounting more permanently to the blade. The Trovel is light, yet stiff, and will not loose its shape through friction as most Trowels do.



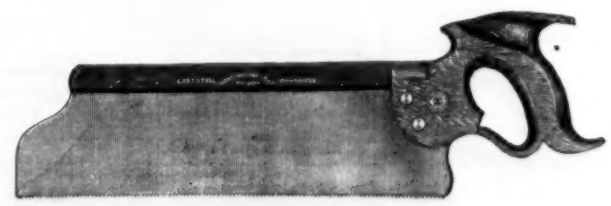
THE COMBINATION SAW.

The Combination Saw, which we illustrate herewith, is an article which fills a long-felt want: it combines five tools in one, each tool as light as any one of the tools in separate form. This combination being made entirely of metal, and put together with metal, is always firm and true. No shrinkage can affect it. It is the most complete weather board Saw in the world, and with our little Pocket Level it presents a complete Plumb and Level, a Hand Saw, a good Square, and Rule.



COMPASS SAWS.

Our new Compass Saw is a great improvement on the style in common use—with it the operator need not bring his hand in contact with the saw blade when extra power is required, as provision is allowed in the handle for two full hand grips. They are cheaper than common Compass Saws, when you consider that broken blades can be renewed at a small cost, whereas in the old style, when the blade is broken, the whole tool is useless. We advance one size in price for our New Patent Handle, *i. e.*, for 10 inch blade and new Handle, we charge 12 inch price. The blades are sold in nests, or separately, and are interchangeable.



NEW PATTERN BACK SAW.

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Anvils.
American ₩ ℔ 15c. dis 20 %
Wright's ₩ ℔ gold 10¾c; over 250 ℔s 11c, gold
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Wilkinson's ₩ ℔ gold 11c
Eagle Anvils (American) ₩ ℔ 10c dis 20 %

Apple Parers.
Domestic, Turn Table, Lightning, Hudson's, Reading, Union ... $7 75 ₩ doz
Skeleton Paring, Coring and Slicing ... $8 00 ₩ doz net
Bay State, Paring, Coring and Slicing ... $15 00 dis 10 %
Climax Slicer ... 8 00

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" " Stearns' ₩ doz $48 ... dis 25&10 %
" " Ives' Expansive ... each $4 50 ... dis 40 %
" " Universal Expansive, each $4 50 ... dis 10 %
Gimlet Bits—Screw, $7 50; no screw, $9 ... dis 2&10 %
Double Cut Gimlet Bits, Shepardson's ... dis 20 %
" " Ct. Valley Mfg. Co ... dis 30&10 %
" " Hartwell's ... dis 50 %
" " Douglass' ... dis 25&10 %
" " Ives' ... dis 30 %
Morse's Bit Stock Drills, List of Jan'y 1, '76 ... dis 25 %
L'Hommedieu's Ship Augers ... dis 20 %
Watrous Ship Augers ... dis 20 %
Vaughan's Pod Hole ...
6 in. $23 00; 7, 8 and 9 in. $25 per doz ... dis 20 %
Lead's ... $4 00 each—dis 10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common ... per gross $1 20—dis 15 %
" " Best ... per gross $1 60—net
" Shouldered Peg ... per gross 2 25—dis 15 %
" Patent Peg ... per gross 60—dis 15 %
" Shouldered Brad ... per gross 2 25—dis 15 %
Brad Sets, Aiken's ... per doz $13 50—dis 40 %
" No. 44, $10 50; No. 43, $12 50 ... dis 40&10 %
" Clark's ... dis 50 %
" Stanley's Excelsior ... $13 50—dis 30&10 %

Axes.
Brook's ... per doz $12 00 @ 14 00 net
Blood's ... per doz $15 00 @ 16 50—dis 20 %
Hunt's ... ₩ doz $12 50 @ 14 00
Collins' ... ₩ doz 11 00 @ 15 50 net @ dis 5 %
H. Clark's (J. C. W. & Co.) bron'd or red. ₩ doz $10 00 net
Hunt's Razor Blade ... ₩ doz 11 00 @ 12 00
Simmons' ... ₩ doz 11 00 @ 11 50
Morris' ... ₩ doz 12 50 @ 13 50
Red Jacket ... ₩ doz 12 00 @ 12 50
Mann's ... ₩ doz 14 50 @ 14 70
" Double Bitted ... ₩ doz 23 00 @ 25 00
Underhill's ... ₩ doz 12 00 @ 13 00
" Crown ... ₩ doz 12 50 @ 13 50
John Leverett's ... ₩ doz 12 50 @ 15 50
Ten Eyck ... ₩ doz $11 50 @ 13 00 net
M. H. Jones & Co ... ₩ doz 10 50 @ 11 50 net
Nobles Mfg. Co ... per doz $10 50, net
Elephant ... per doz $9 50 @ 10 50 net

Axles.
Common (Guy C. Hotchkiss, Field & Co.) ... ₩ ℔ 4½c
Solid Collar, Case Hardened, Chilled Box ... ₩ ℔ 6c.

Axle Grease.—Frazer's ... dis 40 %

Balances. ... dis 40 %

Bands.—Plated ... new list dis 50&5 %
Iron ... new list dis 25&5 %
Brass (Plated list) ... new list dis 50&5 %
Orcide ... new list dis 50&5 %

Bed Keys.
Gray's Ratchet ... ₩ doz $4 00, dis 15 %

Bells.
Hand, Light Brass ... dis 70&10 %
" Extra Heavy ... dis 40&10 %
" White Metal ... dis 50&10 %
" Silver Chime ... dis 30&10 %
" Swiss ... dis 25 %
" Globe (Cone's Patent) ... dis 20&10 %
Gong, Abbe's ... dis 20&10 %
" Yankee ... dis 35 %
" Barton's ... dis 25&10 %
Crank, Taylor's ... dis 50 %
" Brook's ... dis 10 %
" Cone's ... dis 50&10 %
" Connell's ... dis 60&10&10 %
Lever, Sargent's ... net
" Taylor's Bronze or Plated Lever ... dis 25&10 %
" " Japanned Lever ... dis 50&10 %
" Hart, Bilven & Mead Mfg. Co ... dis 50&10 %
Pull ... dis 50 %
" Brook's ... dis 25&10 %
" Western ... dis 15 %
Call ... dis 20&10 %
Cow—Common Wrought ... dis 30&10 %
" Western ... dis 50&10&10 %
" " Sargent's ... dis 50&10&10 %
" Kentucky "Star" ... dis 50&10&10 %
" " Sargent's ...
" Dodge's Genuine Kentucky, new list—
Nos. 0 1 1¾ 2 3 4 5 6 Hog.
$12 00 10 00 9 00 8 00 6 00 5 00 3 50 2 50 5 00—dis 50 %
" Yaw's Genuine ... dis 33 %
" Texas ... dis 35 %

Bellows.
Blacksmiths', Common. List of Sept. 15 ... dis 20 @ 25 %
" Extra and Pittsburgh Pattern ... List net
Moulders' ... dis 25 %
Hand Bellows ... dis 10 %

Blind Adjusters.—Domestic ... ₩ doz $3—dis 30 %

Blind Fasteners.
Mackrell's ... dis 30 %
Van Sand's, No. 4000, $14 00; No. 3705, $10 50 net @ dis 5 %
Washburn's Patent ... ₩ gross $14 00 dis 5 %
Merriman's ... new list net

Blind Staples.
Boardman's Patent, ⅛ in. and larger ... ₩ ℔ 37 c
" ⅜ in ... " 42 c

Blocks.
Differential Pulley Blocks ... dis 25 %
Tackle, Rope and Iron Strapped, Providence Tool Co.'s list ... dis 30&10 %
Burr's ... dis 10 %
Stanley Rule and Level Co ... dis 25&10 %

Bolts.
Cast Iron Barrel, Shutter, &c ... dis 60&10 %
Cast Iron Chain ... dis 60&10&10 %
Wrought Iron Barrel ... dis 50, 10&10 %
" Square ... dis 50, 10&10 %
" Shutter ... dis 60&10 %
Wrought Iron Flush, Stanley's ... dis 15&10 %
" Sargent's ... dis 50&10&10 %
Carriage and Tire, Common ... dis 75 %
" " Norway Iron ... dis 50&10 %
" " R. B. & W. (old list) dis 65&5 %
" " Philadelphia ... dis 60&5 %
" " Shelton's (old list) dis 60&10 %
Union Nut Company, old list ... dis 60&5 %
Stove ... dis 30 %
" R. B. & W ... dis 35 %
" Shelton's Shaved Head ... dis 30 %
Machine ... dis 60
Bolt Ends ... 14 @ 15c. ₩ ℔

Borax.

Boring Machines.

	Upright.	Angular.
Hovey's, no Augers	$5 15	$4 00 net
" with Augers	5 00	6 00 net
Douglass', no Augers	5 50	7 50 dis 40 %
" with Augers	9 00	11 00 dis 40 %
Parr's, no Augers	5 00	7 50 dis 30 %
" with Augers	7 50	10 00 dis 30 %
Kellogg's, no Augers	5 25	6 75 dis 15 %
Sweets'	3 25	4 00 net
" with Augers	5 00	6 00 net
Snell's	4 75	6 25 dis 25 %
Phillips', with Augers		10 00 dis 25 %
Mortising Machines, $30 00 each ...		dis 20 %

Bow Pins.
Union Nut Co ... new list dis 50&10&5 %
Hotchkiss' ... dis 50 @ 55 %
Hunnason, Beckley & Co.'s ... dis 50&10&10 %
Sargent & Co.'s ... dis 50&10&10 %

Braces.
Barber's Patent ... dis 40&5 %
G. S. Backus ... dis 40&10 %
Wilson Mfg. Co ... dis 10 %
Spofford's Patent ... dis 50 %
Noble's Patent ... dis 40&5 %
Ives' Novelty ... dis 40&7½&10 %
Common Bell (American) ... dis 25 %

Brackets.—Shelf ... dis 60&10 @ 65&10 %
Bright Wire Goods ... dis 65&10&10 %
Butt Hinges.—Union Nut Co ... dis 50&20 %
Sargent's ...
Hotchkiss' ... 2½ in., $2 25 net
Hunnason, Beckley & Co.'s ... dis 50&10&5 %

Butchers' Cleavers.
Hunnason & Beckley Mfg. Co ... dis 20&10 %
Bradley's ... dis 25 %
Beatty's ...

2	3	4	5	6	7	8
$19 00	$21 00	$24 00	$27 00	$30 00	$33 50	$36 50	$40 00

Hart Mfg. Co ... dis 45&10 %

0	1	2	3	4	5	6
$25 25	$29 75	$34 25	$38 75	$43 25	$48 50	$54 00

Butts.
Wrought Brass ... dis 30 %
Cast Brass ... dis 20 %

COMMON CAST, NOT DRILLED.
Fast Joint, Narrow ... New list July 1, dis 30&10 %
" Broad ... " dis 40&10 %
" " Jap'd ... " dis 35&10 %
Loose Joint, Narrow and Broad ... " dis 50&10 %
" " " Jap'd " dis 45&10 %
Parliament Butts & Mayer's Hinges " dis 40&10 %
Loose Pin " dis 45&10 %
Loose Pin Japanned " dis 55&10 %
Loose Pin Jap'd, Plated Tips " dis 60&10 %

DRILLED AND WIRED.
Fast Joint, Narrow ... New list July 1, dis 25&10 %
" Broad ... " dis 35&10 %
Fast Joint, Broad, Japanned, New list July 1, dis 30&10 %
Loose Joint ... new list July 1, dis 45&10 %
" Japanned ... " dis 45&10 %
Loose Pin ... " dis 40&10 %
" Japanned ... " dis 50&10 %
" " Plated Tips " dis 45&10 %
Union Mfg. Co.'s Fancy Butts.—
Figured Enameled Loose Joint ... dis 55&10 %
Nickel Plated ... dis 33⅓&10 %
Boston Finish, Plain ... dis 30&5 %
" " with Iron Acorns ... dis 75&5 %
" " with Sil'd " ... dis 65&5 %

WROUGHT IRON.
Fast Joint, Narrow ... dis 30&5
" Lt. Narrow ... dis 25&5
" Broad ... dis 35&5
Loose Joint, Broad ... dis 40&5
Table Butts, Back Flaps, &c ... dis 5 &5
Inside Blind, Regular ... dis 30&5
" " Light ... dis 40&5
Loose Pin Wrt ... dis 25 %
Am. Spiral Spring Butt Co., list May 1st ... dis 25 %
Union Spring Hinge Co ... dis 20 %
Blind Butts, Parker ... dis 65&10 %
" Palmer ... dis 40 %
" Seymour ... dis 65 @ 65&10 %
" Shepard ... dis 65&10 %
" Lull & Porter ... dis 60 %
" Nicholson ... dis 45&10 %
" Huffer ... dis 33⅓&10 %
" Garretson, No. 1 ... dis 65 %
" Clark's Nos. 1, 2 and 5 ... dis 65&10 %
" Clark's No. 30 ... dis 70&10 %
" " Nos. 2 4 4½, 6, 8, 10 ... dis 45 %

Can Openers.
Messenger's Comet ... per doz $3 00 dis 20 %
American ... per doz 2 25 dis 50 %
Lyman's ... per doz 3 75 dis 20 %
No. 4, French ... per doz 2 25 dis 50 %
No. 5, Iron Hangue ... per doz 2 25 dis 40 %
Sprague's ... Nos. 1 2 3 4
Per doz $4 00 4 50 5 00 9 00 dis 55&10 %
Star ... per doz $5 00 dis 20&10 %
Eureka ... per doz $2 50 net
Sardine Scissors ... per doz $7 00 dis 50 %

Caps—Percussion, per 1000.
G. D ... .37 @ 40c
Ely's E. B ... 1-4s, 55c.; 1-10s, 70c. gold
" Double Waterproof, 1-4s, $1 50; 1-10s, $1 55c., gold
Colt's ... 1-10s, 80c., gold

Carpet Sweepers.
Union ... each $2 75 net
Welcome ... each 2 75 net

Cartridges.—Metallic ... dis 57½ @ 60 %

Cards.—Horse and Curry ... dis 30&10 %
Cotton ... dis 10&10 %
Wool ... dis 15&10 %

Carpet Stretchers.
Cast Steel, Polished ... per doz $5 00 dis 30 %
Cast Iron, Steel Points ... per doz $2 00 dis 45&5 %

Casters.
Jed ... dis 30&10 @ 40 %
Plate and Shallow Socket ... dis 40&10 %
Deep Socket ... dis 40 %

Cattle Leaders.
Hotchkiss' Sons' ... net
Humason, Beckley & Co.'s ... dis 60 %
Sargent's ... dis 60&10 %

Chain

English Coil ...						net gold
₩ ℔	11¼	8⅜	7⅛	7¼	7¼	7c
	5-16	¼	5-16	⅜	7-16	½

Trace, 6¾-10-2 ... by the cask, ₩ pair, gold 50 @ 52½
Trace, 7-10-2 ... by the cask, ₩ pair, gold 55 @ 57c
German Halter Chain ... dis 25 % gold
German Coil ... dis 25 % gold
Galvanized Pump Chain ... ₩ ℔ 10¾ @ 11c.
Jack Chain, Iron ... dis 50&10 %
" Brass ... dis 40&10 %

Chalk.
White ... ₩ gross, 57c net
Red ... ₩ gross, 90c net
Blue ... ₩ gross, $1 00 net
White Crayons ... ₩ gross, 16¼c net

Chisels.
Socket Framing, Douglass, Extra ... dis 60&10 %
" " Crossman ... dis 50&15&10 %
" " Buck Bros ... new list dis 15 @ 17½ %
" " Hart Mfg. Co ... dis 60&10 %
" " Merrill ... dis 60&10 %
" Firmers, Douglass, Extra ... dis 60&10 %
" " Crossman ... dis 50&10&10 %
" " Buck Bros ... new list dis 15 @ 17½ %
" " Hart Mfg. Co ... dis 60&10 %
" " Merrill ... dis 60&10 %
Socket Corner ... dis 40 %
Tanged Firmers, Butcher's ... $3 25 to £ gold
" " Newbould's ... $3 50 to £ gold
" " Spear & Jackson's ... $3 00 to £ gold
" " Buck Bros (Shank) ... $3 25 to £ gold

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron ... dis 25 %
" Adjustable, Gray's ... dis 20 %
" " Lambert's ... dis 2[illegible]
" " Snow's ... dis 40&5 %
" " Hammer's ... dis 20 %
" Cabinet, Sargent's ... dis 60&10 %
" Carriage Makers', Sargent's ... dis 55&10 %

Clips, Axle.
Norway or Best ... dis 40 %
Superior ... dis 50 @ 55 %

Cockeyes—1¼ in., 23c.; 1⅛ in., 33c.; 1 in., 37c. net

Cocks.
Brass Backing ... dis 40 %
Lock and Globe ... dis 40 %
Lever Bibbs ... dis 40 %
Ale and Beer ... dis 25&10 %

Coffee Mills.
Board and Box ... dis 15 @ 20 %
Brighton ... dis 20 %
Increase Wilson's ... dis 20 %
Selsor's Pat ... $9 50, $10 50—dis 25 %
American (Enterprise Mfg. Co.) ... dis 20 %
French Steel ... dis 20 %
The Swift ... dis 20 %

Compasses and Dividers.
Bemis & Call Co.'s ... dis 35&10 %
Cook's ... dis 15 %
Excelsior ... dis 40 %
Peck Stow & Wilcox ... dis 25 %
Miller's Patent ... dis 25&10 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %
Chas. E. Little ... dis 20 @ 25 %

Corkscrews.

Corn Knives and Cutters.
Bradley's ... dis 10 %

Crow Bars.
Cast Steel ... ₩ ℔ 11c. net
Iron, steel points ... ₩ ℔ 5c
Crucibles.—Gautier & Co ... No. 5½c

Curling Irons, &c.
⅛, ⅝, ¾ in., $1 80, $2 00, $2 40 ... dis 10 %
Curling Tongs ... ₩ doz $6 50—dis 15 %
Pinching Irons ... ₩ doz 7 50—dis 20 %

Curry Combs.
Curry Comb Mfg. Co ... dis 25&10 %
Hotchkiss' & Kellogg's, Iron & Brass, old list ... dis 40 %
Fitch's (List of No. 245, $1) ... dis 25&10 %
Rubber ... ₩ doz, $9 00—dis 15 %
Wood Tooth (Fuller Bros.) ... per doz $2 25 net

Curtain Pins.—Silvered Glass ... new list dis 10 %

Cutlery.
American Table, Meriden Cutlery Co, New list Jan. '75, dis 25 %
American Pocket, Meriden Cutlery Co, dis 30&10 %
Am. Pocket—Humason & Beckley Mfg. Co ... dis 30&10 %
Am. Miller Bro.'s Cutlery Co ... dis 25 %
Naugatuck Cutlery Co ... dis 25 %

Dipp-rs.
Britannia ... per doz 7 50—dis 30 %; by bbl. dis 33⅓ %
Cocoa, Plain ... per doz $3 25—dis 30 %
" Rimmed ... per doz 3 75—dis 20 %

Dog Collars.
Embossed Gilt ... dis 20 %
Leather ... dis 30 %
Brass ... dis 25 %

Door Springs.
Rod, Torrey's ... ₩ doz $3 50 net
" Gray's ... ₩ doz $2 50 net
" Johnson's ... ₩ doz $8 00 net
Coil Springs, Gem ... Nos. 1 2 3
Per dozen ... $2 50 $2 50 $2 00, dis 10 %
Challenge ... Nos. 9 7 6
Japanned ... per doz $2 00 2 50 3 50
Coppered ... per doz 4 00 4 50 5 00 } dis 10 %
Galvanized ... per doz 3 50 4 00 4 50
Nickeled ... per doz 5 50 6 00 7 00
Philadelphia ... 5 in., $5 00; 8 in., $7 00 dis 15 %
Barker's Concealed ... dis 15 %

Drawing Knives.
Crossman's No. 1 ... dis 50&15& 0 %
Douglass, Extra ... dis 60&10 %
Hart Mfg. Co., No. 1 ... dis 60 %
Merrill ... dis 60&10 %
Nobles Mfg. Co ... dis 15 %
Bradley's ... dis 25 %
Adjustable Handle ... dis 15 %

Drills and Drill Stocks.
Blacksmiths' ... each $2 60 net
" Self-Feeding ... each $7 50 net
Breast, P. S. & W ... dis 45 %
Breast, Aiken's ... dis 25&10 %
" Hotchkiss ... dis 10 %
" Wilson's ... dis 10&5
" Miller's Falls ... dis 25 %
Ratchet, Merrill's ... dis 20 %
" Ingersoll's (old list) ... dis 35 %
" Whitney's ... dis 20 %
Ratchet, Weston's ... dis 20 %
" Moore's Triple Action ... dis 20 @ 25 %
Wilson's Drill Stocks ... dis 10 %
Automatic Boring Tools ... each $2 75—dis 30 %

Drill Chucks.
Danbury ... each 10 00, dis 20 @ 25 %
Morse's Beach Patent ... dis 30 %
" Adjustable ... each $10 00, dis 30 %

Egg Beaters.

	8 in.	10 in.
Monroe's ... Per doz	$8 00	9 00 ... dis 10 %

Dover ... ₩ doz $6 00—dis 20 %
National ... ₩ doz $4 50—dis 20 %
Peerless ... ₩ doz $3 00—net

Emery.
Genuine Chester—Regular Nos ... ₩ ℔ 6c } dis 10 %
" Flour and FF ... ₩ ℔ 4c }
Washington Mills—Regular Nos ... ₩ ℔ 8c
" Flour ... ₩ ℔ 5c
Wellington Mills, Grain ... ₩ ℔ 10c. net
" Flour ... ₩ ℔ 8c. net
Grub ...

Enameled and Tinned Ware.
Kettles ... dis 30 @ 40 %
Sauce Pans ... dis 25 %
Glue Kettles ... dis 25 %
Tinned Saucepans ... dis 25 %

Escutcheons.
Door Lock ... Same discounts as Door Locks
Brass Thread ... dis 60&10 %
Wood ... dis 25 %

Faucets.
Fenn's ... dis 50 %
" Cork Stops ... dis 40 %
Star ... dis 55&10 %
Frary's Patent Petroleum ... dis 15&10 %
Wood and Metallic ... dis 40 %
Wood, Cork Lined ... dis 65&10 %
Enterprise Mfg. Co., Self-Measuring ... dis 20 %

Felloe Plates. ... ₩ ℔ 15c; dis 25&10 %

Files.
American File Co ... $5 00 to £ currency—dis 20 %
Arcade File Works ... $5 00 to £ currency
Auburn File Works ... $5 00 to £ currency
Nicholson ... new list, Jan. 1, 1875, net
C. D. Paul's ... $5 00 to £ currency
Heller & Bros ... $5 00 to £ currency
Johnson & Bro ... $5 00 to £ currency
"Western" ... 5 00 to £ net
Wheeler, Clemson & Co ... $5 00 to £ currency
Rothery's ... $5 to £ currency
J. & Riley Carr ... 5 00 to £ gold
" Horse Rasps ... 5 00 to £ gold
Stubs' ... 3 50 @ 9 00 to £ gold
Butcher's ... 4 50 to £ gold
Walter Spencer & Co.'s "Diamond" ... 4 50 to £ gold
Spear & Jackson's ... 5 00 to £ gold
Jowitt's ... 4 50 to £ gold
W. K. & C. Peace's "Imperial" ... 5 25 to £ gold
R. Ibbotson ... 5 00 to £ gold
Turton Bros. & Matthews ... $5 50 to £ currency
Fisher's ... 4 75 to £ gold
Goodlad's ... 4 00 to £ gold
Moss & Gamble ... 4 75 to £ gold
Thos. Turner & Co. (Peter A. Frasse & Co.) ... 5 00 to £ gold
" Horse Rasps ... 5 25 to £ gold
"Philo Sheffield," P. T. Co ... 5 00 to £ gold
Limet & Co. (French) ... 4 25 to £ gold

Fluting Machines.
Mrs. Coles' ... 5 in., $6 00; 7 in., $7 00, dis 15 %
" Pony, 4 in., $4 75; 5 in. $5; 6 in. 5 50; 7 in. $6 in 10 %
Knox, 4 inch Rolls ... each $4 50 net
" 5 " ... each 5 00 net
" 6 " ... each 6 00 net
O. K ... 6 50 each net
Peerless, 4-inch Rolls ... 4 00 each net
" 5 " ... 4 75 each net
Excelsior, No. 1 ... 4 75 each net
" No. 2 ... 6 50 each net
Diamond ... 7 50 each net
Champion, 6 inch rolls ... 6 00 each net
" 4 inch rolls ... 5 00 each net
Empire ... 4 00 each net
Eureka, No. 1, 7-inch Roll ... 8 00 each net
" No. 2, 5-inch Roll ... 6 00 each net
Defiance ... 4 in., $3 50; 6 in., $4 00; 8 in., $6 50 each net
K. F. M., 4½-inch Roll ... 5 50 each dis 15 %
" 6-inch Roll ... 6 00 each dis 15 %
Crown ... each $4 50, net
Domestic Fluter ... $1 50 each net
Geneva Hand Fluter ... per doz $1 75 net
" " Pick in Handle ... dis 25&10 %

Flating Scissors.
Forges, "Empire" (W. P. Kellogg & Co.) ... dis 20 %

Forks.
Hay, Manure & Spading ... dis 30 %
Plated A 1 ... dis 40 %

Fry Pans.
Burnished, P. S. & W., new list ... dis 40 %
₩ doz ... $3 00 3 75 4 25 4 75 5 75 6 00 7 00 8 00 9 00
No. ... 0 1 2 3 4 5 6 7 8

Gauges.
Marking ... dis 4&10 %
" Star ... dis 35 %
Wire ... dis 10 %
" Smith's Patent ... per doz $18 00, dis 40 %

Gimlets.
Nail and Spike ... dis 25&10 %
"Bee" Gimlets ... per gross, $12 00, dis 30 %
Double Cut, Shepardson's ... dis 20 %
" " Hartwell's ... dis 40 %
" " Ives' ... dis 25 %
" " Douglass' ... dis 25&10 %

Glue Pots.
Tinned and Enameled ... dis 25 %
Family, Howe's "Eureka" ... dis 25 %
" L. F. & C.'s "Handy" ... dis 25 %

Grind Stone Fixtures
Sargent's Patent ... dis 65&10 %
Reading Hardware Co ... dis 50&10 %
J. F. Green & Bro ... dis 40 %
Hart Mfg. Co.'s ... dis 60&5&10 %
Rice Bros ... dis 45&5 %

Hammers.
Emmet Hammer Co.'s Handled ... dis 25 %
" Sledge & Stone, ₩ ℔ 40c.; dis 40 %
Humason & Beckley Mfg. Co ... dis 10&10&10 %
Maydole's ... dis 12 %
Henry Hammonds' (Maydole's List) ... dis 12 %
Cheney's ... net @ dis 5 %
Verree ... dis 5 %
Yerkes & Plumb ... dis 20 %
Magnetic Tack ... dis 25&10 %
Warner & Noble's ... dis 20 %

Hand Cuffs and Leg Irons.
Tower's Hand Cuffs, $4 00 per pair ... } dis 35 %
" Leg Irons $6 50 per pair ... }
Providence Tool Co.'s Hand Cuffs, $15 per doz } dis 10 %
" " Leg Irons 36 " }

Handles.
Door or Thumb Latches—

Nos.	0	1	2	3	4
Per doz	$1 80	1 00	1 18	1 35	1 50—dis 6,&10 %

Roggin's Latches ... 35c. @ 40c. net
Bronzed Iron Drop Latches ... per doz $1 00 @ 1 25 net
Wrought Chest ... dis 60&10 %
Surface Chest ... dis 65&10&10 %
Flush Chest ... dis 60&10&10 %
Lifting ... dis 60&10 %
Cuffin ... dis 50&10 @ 60&10 %
Saw and Plane ... dis 25&10 %
Boynton's Patent X Cut ... dis 10&5 %
" Centennial X Cut ... dis 10&5 %
" Ice Saw, Wrought Iron ... each $1 00 net
Hammer and Hatchet ... dis 10 %
N. Carolina Handle Co ... dis 15 %
Brad Awl ... per gross $3 50—dis 20&10 %
Hickory Firmer Chisel, ass'td ... 5 25—dis 20&10 %
" " " large " 6 50—dis 20&10 %
Apple " " ass'td " 6 00—dis 20&10 %
" " " large " 7 50—dis 20&10 %
Socket " " ass'td " 8 50—dis 20&10 %
" Framing " " 7 00—dis 20&10 %
File ... " " 4 00—dis 20&10 %
Auger ... " " 6 50—dis 20&10 %
" ... large " 8 00—dis 20&10 %
Patent Auger, Ives' ... dis 25&10 %
" " Douglass' ... per set $1 25—dis 10 %
" " Swan's ... per set $1 00—dis 20&10 %

Hangers.
Barn Door ... dis 65&10 %
"Anti-Friction" No. 1, $1 25; No. 2, $1 50 ₩ pr ... dis 40 %
Novelty ... dis 40 %
Challenge ... dis 40 %

Harness Snaps.
Hemelway's ... dis 35&10 %
Judd's ... dis
Fitch's (Bristol) ... dis 30 %
Hotchkiss' ... dis 10 %
Andrews' ... dis 25 %
Sargent's ... dis 50&10 %
New York Wire ... dis 30&20 %

Hatchets.—Isaiah Blood ... dis 15 %
Shingling, Nos. 1 2 3 ... ₩ doz $7 25 8 00 8 75
Claw, " 1 2 3 ... ₩ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ... ₩ doz 7 50 8 00 8 50
Hart's ... dis 30 %
Shingling, Nos. 1 2 3 ... ₩ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ₩ doz 8 00 8 50 9 00
Newark's Edge Tool Co.'s ... dis 25 %
Shingling, Nos. 1 2 3 ... ₩ doz $6 50 7 00 7 50
Claw, " 1 2 3 ... ₩ doz 7 25 7 75 8 25
Lathing, " 1 2 3 ... ₩ doz 6 50 7 00 7 50
Yerkes & Plumb ... dis 20 %
Shingling, Nos. 1 2 3 ... ₩ doz $7 00 7 50 8 00
Claw, " 1 2 3 ... ₩ doz 7 50 8 00 8 50
Lathing, " 1 2 3 ... ₩ doz 7 00 7 50 8 00
Simmon's ... dis 20 %
Shingling, Nos. 0 1 2 3 ... ₩ doz $7 50 8 00 8 50 9 00
Claw, " 1 2 3 ... ₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ₩ doz 8 00 8 50 9 00
Broad, " 1 2 3 ... ₩ doz 9 00 10 00 12 00
" " 4 5 6 ... ₩ doz 14 00 16 00 18 00
" " 7 8 ... ₩ doz 20 00 22 00
Elephant ... dis 30 %
Shingling, Nos. 1 2 3 ... ₩ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ₩ doz 8 00 8 50 9 00
Underhill's ... dis 10 %
Shingling, Nos. 1 2 3 ... ₩ doz 7 25 8 00 8 75
Claw, " 1 2 3 ... ₩ doz 7 75 8 50 9 25
Lathing, " 1 2 3 ... ₩ doz 12 00 11 50 12 00
M. H. Jones & Co ... dis 25 %
Shingling, Nos. 1 2 3 ... ₩ doz $8 00 8 50 9 00
Claw, " 1 2 3 ... ₩ doz 9 00 9 50 10 00
Lathing, " 1 2 3 ... ₩ doz 8 00 8 50 9 00

Hay Knives.—"Lightning" ... per doz $30 00 net

Hinges.
Gate, Western ... ₩ doz $6 25—dis 60&10 %
" N. E ... ₩ doz 11 25—dis 6 .&10&10 %
" N. Y. State ... ₩ doz 7 20—dis 60&10 %
Rolled Plate ... dis 65&10 %
" Raised ... dis 65&10 %
Wrought Strap and T ... dis 55 %

Providence Plate, { 6 and 8 in. 11c ₩ ℔ / over 8 in. 9¼c ₩ ℔ } ... dis 40 %
Screw Hook and Strap ... { 8 to 10, 12 in. 9¼c / 14 to 36 in. 11 c } dis 40 %
Heavy Welded Hook ... { 8 to 12 in., 9¼c / 14 in & up, 11 c } dis 30 @ 40 %
Screw Hook and Eye ... { ⅝ to 1 in., 8¼c / ⅜ in. 9¼c / ⅛ in. 11¼c } ... net

Hoes.
Solid Shank, C. S ... ₩ doz $8 00—dis 30 %
Socket ... ₩ doz 9 00—dis 30 %
Riveted Eye ... ₩ doz 5 00—dis 30 %
Grub ... dis 25 %
Planters ... dis 15 @ 20 %
Scovill Pattern ... dis 10 %
Lane's C. E. Cresent, American Pattern ... dis 5 %
" " " Scovil Pattern ... net

Hooks.
Bird Cage ... dis 60&10 @ 70&10 %
Cotton ... dis 50 %
Belt ... dis 60&10 %
Bench—Hotchkiss' $5 00 ₩ doz ... dis 10 %
" Weston's No. 1, $8 00; No. 2, $7 00 per doz net
" McGill's ... $3 00 per doz, dis 10 %
" Skinner's ... per doz $6 25, dis 20 %
Clothes Line, Hart's list ... dis 6 &10&5&10 %
Ceiling, Hart's list ... dis 60&10&10 %
Harness, Sargent's list ... dis 60&5&10 %
" Reading list ... dis 35&10 %
Coat and Hat, Hart's list ... dis 60&10&10 %
" " Sargent's list ... dis 60&10&10 %
" " Reading ... dis 35&10 %
Wrought Staples and Hooks and Staples ... dis 75 %
Wire Screw Hooks and Eyes ... dis 65&10&10 %
Grass ... dis 30 %
Whiffletree—Patent ... dis 35 @ 40 %
Hooks and Eyes—Malleable Iron ... dis 60&10&10 %
" " Brass ... dis 60&10&10 %

Horse Nails.

Nos.	5	6	7	8	9	10
Ausable ... ₩ ℔	30c	27c	25c	24c	23c	23c
" P't'd & Pol'd.. "	31c	29c	28c	25c	24c	23c
" & Blued.. "	31c	28c	26c	25c	24c	23c
Cortland ... "	29c	26c	24c	23c	22c	21c
Buffalo Forged ... "	31c	28c	26c	25c	24c	23c
Globe, P't'd & Pol'd ... "	31c	28c	26c	25c	24c	23c
National, Pointed and Polished, Pat. Fin ... "	29c	25c	23c	22c	21c	20c
National, Pointed and Polished, Ex. Fin ... "	30c	27c	25c	24c	23a	22c
Perkin's P't'd—Black.. "	29c	25c	23c	22c	21c	20c
Perkins' Pointed and Polished ... "	30c	26c	24c	23c	22c	21c
Perkins' Pointed and Blued ... "	30c	26c	24c	23c	22c	21c
Putnam ... "	29c	26c	26c	25c	24c	23c
Vulcan, P't'd & Blued. "	31c	28c	26c	25c	24c	23c

Star Brand, 16c.; Morgan ... 14c
Hungarian ... 3000 lbs., dis 5 %
Ausable, National and New London ... 1000 lbs., dis 5 %
Perkins' and Vulcan ... 1000 lbs., dis 7½ %
Perkins', Vulcan and Globe ... 500 lbs., dis 5 %

Horse Shoes.
Burden ... ₩ keg, $4 62½
R. I. Horse Shoe Co., Perkins Pattern ... ₩ keg, $4 87½
" " R. I. Pattern ... ₩ keg, 5 12½
Mule Shoes ... ₩ keg, 5 87½
Perkins' Snow ... ₩ keg, 5 87½
The Boston Horse Shoe ... per keg $5 00
Boston Rolling Mills Hand Made ... ₩ ℔ 8c

Ice Awls, Chisels, &c.
American Ice Chisel ... per doz $6 50 net
National " " ... per doz $6 50, dis 10 %
Novelty Ice Breakers ... per doz $6 50, net
White's Sliding Head Picks ... per doz $2 25, net
Dunlap's Ring Picks ... per doz $8 00, net
Wood Head Picks, Sargent's ... per doz $1 85, dis 60&10 %
Iron ... per doz $1 85, dis 60&10 %
Ice Mallets, Pick in Head ... per doz $1 75 net
" " Pick in Handle ... per doz $3 00 net
Ice Axes, Small, Cast or Malleable ... per doz $1 50 net

Kettles.
Brass ... ₩ ℔ 45c net
Enameled ... dis 30 @ 40 %

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe ... dis 15 %
" Bread " ... ₩ doz $1 50—dis 15 %
Hay and Straw, "Wadsworth's" ... dis 25 %
Table and Pocket ...

Sheaves.
Sliding Door, M. W. & Co. list.....dis 40&5&2 %
" " R. & E. list.....dis 50&5&2 %
" Patent Roller.....dis 25&2 %
" " " Hatfield's.....dis 50&2 %
" Russell's Anti-Friction.....dis 50&2 %
Sliding Shutter, R. & E. List.....dis 50&5&2 %
" " Sargent's List.....dis 55&10 %

Shovels and Spades.
Ames.....dis 20 %
Birmingham Shovel Co.....dis 15 %
Rowland's.....dis 25 %
Old Colony.....new list dis 10&5 %
Middleboro' Shovel Co.....new list dis 20 %
C. E. Jennings & Co.....New list dis 30&10 %
Dunning's Shovels and Scoops.....dis 20&7½ %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 50&10&2 %
" " Hart's.....dis 55&2&10 %
Polished Steel.....dis 50&10&2 %

Skates.
Barney & Berry's
N. Y. Club.....₱ pair $2 75
B. & B. Club....." 3 50 } dis 25 %
All Clamp....." 4 25
Rink....." 6 00
Florence Steel.....$1 00 dis 25 %
" Spring.....3 00 dis 30 %
" All Clamp.....3 50 dis 30 %
Peck & Snyder's—
No. 1, Blued.....per pair $5 00
No. 2, Nickel Plated.....per pair 6 00
No. 3, " " extra...per pair 8 00
Clipper Club Blued.....per pair 3 50 } dis...25 %
" " Full Pol'd....per pair 4 50
" " " and Nickel Plated.....per pair 6 00
Acme Club Skates.—Nos. 3 7 10 12 14
Pair $4 00 5 00 7 00 7 50 8 00 dis 20 %

Slates.
Square Frames, Round Cornered, by case.....dis 65&10%
Less than a case.....dis 65%

Spoke Shaves.
Bonney's.....new list dis 25 %
Defiance Metallic.....dis 33⅓&10 %
Iron.....dis 30 %
Wood.....dis 30 %
Bailey's.....dis 25&10 %

Spoke Trimmers.
Bonney's.....per doz $10 00 dis 25&10 %
Stearn's.....per doz $10 00 dis 25&10 %
Ives'.....No. 1, $15 00; No. 2, $12 00 ₱ doz, dis 33⅓&10 %
Douglass'.....per doz $9 00 dis 20&10 %

Spoons.
Tinned Iron.....dis 10 %
By the case.....dis 20 %
Basting.....dis 10 %
Britannia.....dis 50&5 @ 55 %
" Boardman's, new list.....dis 55 %
Rogers & Bro., A 1.....dis 40 %
Derby Silver Co.....dis 40&5 %
Holmes, Booth & Haydens.....dis 40&5 %
Nickel Silver Co.....dis 40 %
German Silver.....dis 30&2½ %
Tin (P. S. & W.)—
Teas.....$1 50 ₱ gross, net
Tables.....2 75 " net

Stocks and Dies.....dis 5&10 %

Stone.
Hindostan Stone.....₱ ₱ 6c
" Axe Stone.....₱ ₱ 8c } dis 20&10 %
" Slips.....₱ ₱ 10c
Sand Stone.....₱ ₱ 6c—dis 20&10 %
Washita Stone.....No. 1, ₱ ₱ 30c net
" " No. 2, ₱ ₱ 25c net
" Slips.....No. 1, ₱ ₱ 60c net
Arkansas Stone.....No. 1, ₱ ₱ $1 35 net
" Slips.....No. 1, ₱ ₱ $2 50 net
Grindstones. Family, J. F. Green & Bro.....dis 20 %
" " Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₱ gross, 6 00
Gem.....₱ gross $4 25 @ 4 50 net
Gold Medal.....₱ gross $6 00 dis 25 %
Rising Sun.....per gross $5 75 net

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2 50 @ $4 00 ₱ doz net
Try Squares and T Bevels.....dis 45&10 %
Star Try Squares and Bevels.....dis 35 %
Disston's Try Squares No. 1.....dis 30 %
" " No. 2.....dis 45 %
" " Improved. Nos. 1 & 2.....dis 30 %
Winterbottom's Try and Mitre.....dis 20&10 %

Tacks, Brads, &c.—List of January 1, 1876.
Tacks, Half Weight, American.....dis 75&
" Full " " .....dis 50&
" Half " Swedes .....dis 65&
" Full " " .....dis 30& } dis 10 %
" Carpet, Am. and Swedes.....dis 10& } for cash
" Leather Head.....dis 10&
" Copper.....₱ ₱ 45c. dis
Brads, Half Weight.....dis 50&
Shoe Nails—
4-8ths and longer, 9c.; 3½-8ths, 9½c. ₱ ₱, dis 10 %
Trunk, Clout and Finishing Nails—
½ ⅝ ¾ ⅞ 1 1¼ in. and over.
15 14 13 12 11 11c. ₱ ₱, dis 10 %
Double Pointed Tacks.....dis 33⅓&10 %

Tap Borers.
Common and Ring.....dis 30&10 %
Ives' Tap Borers.....dis 10&10 @ 25 %
Enterprise Mfg. Co.....dis 30 %

Tapes, Measuring.
American Flask and Cap Co.....dis 20 %
Eddy's.....dis 20 %

Tea Trays.
American Tea Tray Co.....dis 15 %

Thermometers.
Tin Case.....dis 50&10 %

Toe Calks.
Winsted.....₱ ₱ 12c., dis 10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....per doz $12—dis 30&10 %
All Iron.....per doz $19 50—dis 30&10 %
Nashua Lock Co.'s.....per doz $18 00—dis 50 %

Tinners' Tools and Machines.
P. S. & W.....dis 10 %

Traps.
Game, Newhouse.....dis 25 %
" Peck, Stow & Wilcox.....dis 30 %
" Hotchkiss.....old list dis 30 %; new list dis 10 %
" Blake's Patent.....dis 30 %
Mouse, Wood Choker.....₱ doz holes. 15 @ 16c
" Patent Chocker 'Union Nut Co.'.....₱ doz holes 16 @ 18c net
" Round, Wire.....₱ doz $1 50 to 2 00 net
" Square, " .....₱ doz 2 00 to 2 50 net
" Cage, " .....₱ doz 2 50, dis 10 %
" Patent Self Setting.....per doz holes 22c net

Trowels.
Lothrop's Brick and Plastering.....dis 10 %
Disston's Brick and Plastering.....dis 15 %
Pease's Plastering.....dis 30 %
Rose's Brick.....dis 5 %
Brades' Brick.....gold. dis 10 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 25 %

Triers.
Butter and Cheese.....dis 25 %

Ventilators (Window).
Nickel and Gilt.....per dozen $16 00 @ 18 00

Vises.
Solid Box, Trenton...40 to 160 lbs., 16c.; 160 and over, 20c
" " Wilson's...80 to 160 lbs., 18c } dis
160 and over, 22c } 25 %
" " Peter Wrights.....16c gold
Parallel, Parker's.....dis 2
" Wilson's.....dis 30&10 %
" Sargent's.....dis 55&10 %
" Trenton.....dis 15 %
" Backus and Union.....dis 25 %
" Merrill's.....dis 15 %
" Fisher & Norris.....dis 15&10 %
" Buffalo.....dis 25 %
" Stevens'.....dis 15 @ 20 %
" Simpson's Adjustable.....dis 20 %

Saw Filers, Bonney's.....per doz $3 00 dis 20 %
" Stearn's.....per doz $3 00 dis 20 %
" Hopkins'.....per doz $1 50 dis 10 %

Wheel Barrows.
Canal (Pugsley & Chapman).....new list dis 15 %
Coal, Garden and Stone (Pugsley & Chapman).....dis 25 %
Jacob's Pat. Self-Oiling R. R. and Canal.....dis 25 %

Well Wheels.
Revised list.....dis 60&10 %

Wire.
Brass and Copper.....List of Oct. 27, 1875, net
Bright and Annealed.....Nos. 0 @ 18 dis 45 @ 50 %
" " " 18 @ 26 dis 50 @ 55 %
" " " 27 @ 36 dis 55 @ 60 %
Coppered.....0 @ 18 dis 40 @ 45 %
Galvanized, Nos. 9 to 9.....₱ ₱ 8 @ 8½c net
Galvanized, Nos. 10 to 18.....market list dis 15 @ 20 %
Tinned.....dis 25 @ 30 %
Cast Steel.....dis 15 @ 20 %
Tinned Broom Wire.....dis 35 @ 40 %
Galvanized Telegraph, Nos. 8 and 9.....₱ ₱ 9c
Galvanized Telegraph, Nos. 10 and 11.....₱ ₱ 10c
" " " 13.....₱ ₱ 10½c
Annealed Fence, Nos. 8 and 9.....dis 50 %
" Grape, " 10 to 14.....dis 50 %
Fence Staples.....₱ ₱ 7½ @ 8c
Stone' Steel Wire.....$7 00 to 8 gold
Judd's Picture Wire.....dis 50 %
Clothes Line Wire.....per coil 60c. net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S".....dis 30 %
" Diagonal.....dis 30 %
Collins & Co.'s.....dis 45 %
Coes' Genuine.....dis 40&10 %
" Pattern (Wrought).....dis 50&10 %
" " (Malleable).....dis 65&10 %
Diamond Hardware Co.....dis 40 %
Lindsay's Patent.....dis 25 %
Taft's Pattern.....dis 20&10 %
Davis Patent Duplex.....new list dis 25 %
Bemis & Call's Patent Combination.....dis 30&5 %
" " Merrick's Pattern.....dis 25&2½ %
" " Brigg's Patent.....dis 30&5 %
Aiken's Pocket (Bright).....per doz $10 00—dis 50&10 %

Wringers. Less than 3 doz 3 doz lots
Providence, with Cog Wheels.....$72 00 $66 00
Household, without " 60 00 58 00
Universal, " " 60 00 58 00
" with " 72 00 70 00
Eureka, without " 60 00 58 00
Novelty, " " 60 00 58 00
" with " 72 00 70 00
Sherman, " " 72 00 70 00
" without " 60 00 58 00
Reliance, with " 69 00 67 00
Excelsior Bench Wringers.....90 00 87 00
" for Set Tubs.....82 00 79 00

Stamped Tin Ware.
Common Stamped Ware.....dis 10 %
Stamped Deep and Retinned Ware.....dis 20&10 %
Japanned Tin Ware.....dis 5 %
Planished Tin Ware.....dis 20 %

METALS.

IRON.—DUTY Bars, 1 to 1½ cents per lb., Sheet, Band, Hoop and Scroll, 1¼ to 1¾ cents per lb. Provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 per ton; Polished Sheets, 3 cents per lb.; Wrought Scrap, $8 per ton; Cast Scrap, $6 per ton. Railroad, 70 cents per 100 lbs. Boiler and Plate, 1¼ cents per lb.

Pig Iron—AMERICAN.
Foundry No. 1.....₱ ton, $22 00 @ 23 00
Foundry No. 2....." 20 00 @ 21 00
Gray Forge....." 19 00 @ 20 00
SCOTCH.
Coltness....." 32 50 @
Glengarnock....." 30 00 @
Gartsherrie....." 31 50 @
Eglinton....." 28 50 @ 29 00
Summerlee....."

Bar Iron.
Am. Rehned, at mill.....2·4c.

Rails.
American, at works, currency.....₱ ton 40 00 @ 45 00
Old Rails.....

Scrap.
Wrought Scrap....." 30 00 @ 31 00

Bar Iron from Store.
Common Iron.
¾ to 2 in. round and square.....₱ ton $52 50
¾ to 2 in. x ¾ to 1 in.....
Rehned Iron.
¾ to 2 in round and square....." 55 00 @ 57 50
1 to 6 in. x ¾ and 1 to 1 in.....
1 to 6 in. x 1¼ and 5-16....." 60 00 @ 62 50
Shafting Iron—2½ to 4 in....." 60 00 @ 65 00
Rods—3-16 to ⅝ round and square..." 65 00 @ 110 00
Bands....." 70 00 @ 72 50
Hoops—⅝ to 2 in....." 75 00 @ 130 00
Swedish Iron.
Ordinary sizes....." 130 00 @ 132 50
Plow size.....

Sheet Iron.

	Common American and English.	R. G. American.	R. G. English.
Nos. 10 to 20	₱ ₱ 3¾c	5c	5¾c
21 to 24	" 4c	5¼c	5¾c
25 to 26	" 4¼c	5½c	5¾c
27	" 4¼c	5½c	6c
28	" 4¾c	5c	6¼c

Sivanized, 14 to 20, prime, ₱ ₱ 8¾c; 2d quality ₱ ₱ 7¾c
" 21 to 24 " " 9¼c " " 8¾c
" 25 to 26 " " 10 c " " 9 c
" 27 " " 10¾c " " 9¾c
" 28 " " 11½c " " 10¾c

Patent Planished.....A, 13c.; B, 11c. ₱ ₱
Russia, Nos. 8 to 28.....15c
" Stalhed, No. 1.....14c
Belgian.....10c
One piece Corrugated Sheet Iron Elbows.
CHARCOAL IRON.

½	5	5½	6	7 inch.
$2 50	3 50	4 50	5 25	6 50 per doz.

RUSSIA IRON.

4½	5	5½	6	7 inch.
$5 00	7 00	9 50	12 00	14 00 per doz.

COPPER—DUTY: Pig, Bar and Ingot, 5c.; old copper, 4 cents ₱ ₱; Manufactured (including all articles of which copper is a component of chief value) 45 % ad valorem.
American Ingot.....₱ ₱ 23¼ @ 23½c
English " "
SHEATHING, BRAZIERS COPPER, BOLTS, &c.
Braziers Copper, ordinary sizes, over 16 oz., per square foot.....33c ₱ ₱
Braziers Copper, ordinary sizes, 16 oz. and over 12 oz., per square foot.....34c. "
Braziers' Copper, 12 oz. per square foot.....36c. "
Circles less than 24 inch in diameter.....35c "
Circles, 24 inch diameter and over.....33c. "
Segment and Pattern Sheets.....35c. "
Locomotive Fire Box Sheets.....33c.
Sheathing Copper, over 12 oz. per sq. ft.....31c. "
" 12 oz. ₱ sq. ft. and lighter.....33c. "
Bolt Copper.....32c. "
Copper Bottoms, 33c. ₱ ₱.....net
No Copper in Sheathing except 14x48 inches, and not to exceed 54 oz. to the square foot.
Sheathing Copper, tinned on one side, by the case.....6c. ₱ sheet
For less than a case.....8c. ₱ sheet
Tinning Sheets, ordinary sizes.....2½c. ₱ sq. ft
For tinning both sides, double the above amount.
O'NEILL'S PATENT PLANISHED COPPER.
14x48.
14 and 16 oz. and heavier.....37c. By the case, 35c. ₱ ₱
12 oz. and lighter.....40c. " " 39c. "
Boiler Sizes.
7 in., 14x52. 8 in., 14x56. 9 in., 14x60
14 and 16 oz. and heavier.....39c. By the case, 38c. ₱ ₱
(And all sizes not over 20 inches wide.)
30x60
14 and 16 oz. and heavier.....41c. ₱ ₱
12 oz.....44c. "

Brass.
Owen & Sharp's Gauge the Standard except for Fine Wire.
BRASS MANUFACTURERS' PRICE LIST.
October 27th, 1875.
Net cash prices for Roll and Sheet Brass, Wire, &c., for packages of 100 pounds and over at one time. For 50 and less than 100 pounds, three cents additional.
HIGH BRASS
All sizes, to No. 28, and widths 14 in. and under.....37c
All Nos. to No. 24, inclusive, and widths over 14 to 20 in., inclusive.....38c
Over 20 in. to 30 in., inclusive.....38c
½c. ₱ ₱ advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 38 is Platers' Brass, at.....45c
Sheets 24x48 in. and all sheets cut to particular sizes and lengths.....38c
Painters' Rules.....40c
Sheets wider than 30 in. and under 40 in.....40c
" " 40 in. and over.....42c
Circular sheets, in diam. from 4 in. to 14 inclusive....37c
" " " over 14 " 20, " 40c
" " " " 20 " 30, " 43c
" " " " 30 " 40, " 46c
" " " 40 in.....49c
LOW BRASS.
Four cents ₱ ₱ more than High Brass.
Gilding Metal, 7c, ₱ ₱ more than High Brass.
Platers' or Gold Metal } In Bars.....42c
} Sawed.....45c
} Planed or Polished.....48c
FOR SLITTING.
Metal, in width 2 in. to ⅛ in. to No. 30, inclusive, 1c. per ₱. advance.
Metal, in width 2 in. to 1 in., thinner than No. 30, 2c. per ₱. advance.
Metal, in width 1 in. to ⅛ thinner than No. 30, 3c. per ₱. advance.
Metal, in width ⅛ in. to ¼, to No. 30, 2c. per ₱. advance.
Metal, in width ⅛ in. to ¼ thinner than No. 30, 5c. per ₱. advance.
Metal, ¼ in. in width and less, 10c. per lb. advance
GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 in., to No. 26	$0 60	$0 80
6 " " "	70	90
10 " " "	80	1·10
15 " " "	1·00	1·35
18 " " "	1·10	1·50
20 " " "	1·20	1·60

German Silver Sheets over 12 in. wide, and weighing more than 16 lbs., $2 per ₱., net.
Advance 3c. for each additional in., in width above 12 in., and 2c. per ₱. on each No. thinner than Nos. 26 to 36 inclusive.
All German Silver thinner than No. 36 is Platers', at 50c. per ₱. additional.
German Silver Scrap one-third less than net price of 12 in. Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.
BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
Nos. 0 to 20	0·30	0·34	0·40
Nos. 21, 22, 23	0·31	0·35	0·42
Nos. 24 and 25	0·32	0·36	0·43
Brass Rods, No. 8 and larger	0·36	0·40	0·46
Wire straightened and cut, smaller than No. 8	0·40	0·44	0·50

Fancy Wire not less than 4 cents per pound advance of Round Wire.
Spring Wire, 2 cts. per lb. advance.
FINE WIRE, BY THE OLD ENGLISH FINE WIRE GAUGE.

	High Brass.	Low Brass.	Gild'g and Cop'r.
No. 26	0·41	0·45	0·51
No. 27	0·44	0·48	0·54
No. 28	0·46	0·50	0·56
No. 29	0·48	0·52	0·58
No. 30	0·50	0·54	0·62
No. 31	0·52	0·56	0·66
No. 32	0·56	0·60	0·71
No. 33	0·60	0·64	0·81
No. 34	0·64	0·69	0·91
No. 35	0·69	0·73	1·03
No. 36	0·78	0·82	1·15
No. 37	0·98	0·98	1·38
No. 38	1·28	1·28	1·58

Ten cents per pound extra for Spooling.
TUBING.

	₱ ₱
Plain to No. 20 inclusive, above ⅜ in. to 1¼ in.	$ ·44
" 1¼ to 3 in. inclusive	·38
" above 3 in.	·50

Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.

Plain ⅜ inch	·50
" 5-16 "	·60
" ¼ "	·80
" 5-16 "	1·20
" ⅜ "	1·60

All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing, 4 cents advance on List above Plain.
English, Scotch and Extra Patterns Fancy Tubing to No. 20, 9 cents above Plain.
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ¼ cent for each additional cutting under two feet.
All Mandrel Drawn Tubes under ⅜ in., 25 cents per pound advance.
ZINC TUBING.

Plain	·28
Fancy	·31
Scotch and Extra Patterns	·34

GERMAN SILVER TUBING.

4 Per cent.	·85
6 "	·95
9 "	1·10
12 "	1·25
15 "	1·40
16 Per cent.	1·45
18 "	1·55
20 "	1·65

MISCELLANEOUS.

Common Plain Brass Pail Ears	·69
Hose Pipes, 500 and over	·71
" under 500	·76
Door Rail	·40

SCRAP.
High Brass Scrap, 16 cents.
Low " 18 cents.
Gilding, 20 cents.
Turnings, Filings and Chips, half the price of Scrap.
Orders for Goods on this list received on or after this date, will be filled at the rate herein stated,
Terms—Net cash. No discount allowed. Interest to be added after thirty days.

ANTIMONY.....16¾ @ 17c. gold

LEAD—DUTY: Pig $4 per 100 lbs.; old Lead, 1¼ cent per lb.; Pipe and Sheet, 2½ cents per lb.

Spanish	7c gold
German Refined	6¾c gold
English	6¾ @ 7c gold
American	6¾ @ 6¾c gold
Bar	dis 10 %.....9c.
Pipe	dis 10 %.....9¾c.
Tin Lined Pipe	dis 10 %.....16¾c.
Sheet	dis 10 %.....10c.
Shot	dis 10 %. Drop, 10c. Buck, 11c.

BABBITT METAL.
N. P. U.....₱ ₱ 8¾ @ 9c
A, 25c.; B, 30c.; C, 15c.; D, 12c. ₱ ₱.

SOLDER.....No. 1, 14c.; No. 2, 13c

STEEL—DUTY: Bars, Ingots, Sheets and Coils, valued at 7 cents per lb., or under, 2¼ cents; over 7 cents, and not above 11, 3 cents per lb. over 11, 3¾ cents per lb. and 10 % ad val. Railway Bars 1¼ cents per lb. Railway Bars, in part Steel, 1 cent per lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

Tool	15 @ 16c
Spring	10c
Homogeneous	12½c
Tire	12½ @ 13½c
Machinery (round and square)	10 @ 11c
File	11c
Sheet	14 @ 16c
Saw Plate, mill and mulay	14 @ 16½c
Saw Plate, gang and X cut	13 @ 14c
" circular as to size	18 @ 30c

Chrome Steel.

Tool	₱ ₱ 20 @ 21c
Tool, extra fine	40 @ 75c
Spring	₱ ₱ 12c and upward
Machinery	₱ ₱ 14c
Hammer	" 15c.
Gun or Homogeneous	" 16c

English Steel,—payable in gold, net.

Best Cast	₱ ₱ 17½c
Extra Cast	18½c
Round Machinery, Cast	₱ ₱ 10½ @ 11½c
Swaged, Cast	" 19½c
Best Double Shear	" 17½c
Blister, 1st quality	" 14½c
" 2d quality	" 13 c
German Steel, Best	" 11½c
do 2d quality	" 10½c
3d quality	" 9½c
Sheet Cast Steel, 1st quality	" 15½c
" " 2d quality	" 14½c
" " 3d quality	" 12½c
File Steel, Flat and ½ Round	" 12½c
" Square and Round	" 12½c
" Mill	13½c
" Taper to 4 inch	" 16c
" Taper 3 and 3½ inch	" 18c

SPELTER—DUTY: in Pigs, Bars and Plates, $1 50 per 100 lbs.

Silesian, cash	6¾ @ 7c., gold
American "	7¾ @ 11c., currency

TIN—DUTY: Plates, Sheets, Tagger and Terne, 1·1c per lb.; Electro-galvanized Plates, 2 cents per ₱; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs, free. Banca, subject to duty of 10 per cent.

Banca	₱ ₱ 26 @ 27c., currency
Straits	₱ ₱ 22c., currency
English	₱ ₱ 22c., currency

TIN PLATES, CURRENCY PRICES.

I C 10x14, Prime Charcoal	$8 50
12x12, "	9 00
14x20, "	9 25
I X 10x14, "	10 75
12x12, "	11 25
14x20, "	11 75
D C 12½x17 "	8 50
D X 12½x17 "	10 25
For each additional X add	2 25

COKE TIN PLATE.

	Best.	2d Quality.	Ordinary.
I C 10x14	$8 00	7 75	7 25 @ 7 50
I C 12x12	8 50	8 25	7 75 @ 8 00
I C 14x20	8 75	8 25	7 25 @ 7 75

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14x20	$8 00	7 50 @ 7 75	7 00 @ 7 25
I X 14x20	10 25		
I C 20x28	16 50	15 50 @ 16 00	15 00 @ 15 50
I X 20x28	21 50		
I C 20x20	22 00		
I C 14x20 M. F. Brand			$9 25

ZINC—DUTY: Pig or Block, $1 50 per 100 lbs. Sheet 2¼c. ₱ ₱.

Sheet	cask 9¼c
"	open 10c

Paper Stock, Old Metals, &c

(Dealers' Selling Price.)

Canvas linen	6 @
" cotton, No. 1	6½ @ 6¾
" " No. 2	3½ @ 3¾
White linen rags, No. 1	6¾ @
" " No. 2	4¾ @
Colored	2¾ @
Mixed woolens	2½ @ 3¼
Soft woolens	7½ @ 8
Gunny bagging	2 @ 2¼
Jute Butts	2¼ @ 2¾
Kentucky bagging	5¼ @ 5½
Book stock	4 @ 4¾
Waste paper and scraps	1 @ 1¾
Rope cuttings	1¾ @ 3
Kentucky Bale rope	4 @ 4½
Oakum junk, No. 1	5½ @ 5¾
" No. 2	@ 4
Grass rope	3½ @ 4
Tarred Shaking	1½ @ 1¾
White Collar Cuttings, all paper	7 @
" " " muslin lined	5 @
" Envelope "	7 @
Hard White Shavings, No. 1	6½ @
Soft " " No. 1	6 @
White Shavings, No. 2	5¾ @
Mixed Shavings, part white	4 @ 4¾
Imperfections, No. 2, best folded sheets	5 @
" " 1, Heavy Stock	4¾ @
Book Stock, Mixed	3¾ @
" " No. 2, light	2½ @ 2¾
Prints	1¾ @ 2
Pure Manilas	2¾
Bogus Manilas and Hardwares	1 @ 1¾
Commons	1 @
Binders' Board Cuttings	1¾ @
Straw Board Cuttings	1¾ @
Woolen Tailor Clips	13 @ 14
Satinet Tailor Clips	2 @

Old Metal.

Copper	@ 13
Yellow metal	14 @
Brass	13 @ 14
Heavy Composition	16 @ 17
Old lead, solid	6 @ 6¼
Tea lead	5½
Zinc	@ 4¾
Pewter, No. 1	17
" No. 2	10 @ 12
Spelter	@ 6
Wrought iron	per ton $30 00
Machinery iron	per ton $13 50
Light Iron	per ton $16 00
Stove plate	per ton $11 00
Burnt Iron	per ton $11 00

Paints, Oils, etc.

Paints.

Black lamp—Coach Painters	₱ ₱ 20c
" Ordinary	6c
" Ivory Drop, fair	15.
" best	26c
Black Paint, in oil	kegs, 8c.; asst'd cans, 11 c
Blue, Prussian, fair to best	50 @ 75
" " " " in oil	35 @ 65c
" Chinese dry	33c
" Ultamarine	25 @ 30c
Brown, Spanish	1½c
" Van Dyke	9c
Carmine, 40	$12 00
Green, Chrome	15 @ 23c
" " in oil	18 @ 25c
" Paris	good, 33c; best, 40c
" " in oil	30c " 45c
Mineral Paints	1¼ @ 4c
Orange Mineral	14c
Red Lead, American	9½c
" " English	10½ @ 11c
" Venetian (N. C.) dry	2½c
" " in oil	asst'd cans, 11c; kegs, 8½c
" Indian, dry	10c
Rose Pink	13c
Sienna, American, Raw	4c
" Burnt	4½c
" " in oil	16 @ 20c
" Raw "	15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	16 @ 21c
" Raw	5½ @ 7½c
" " in oil	16 @ 22c
Vermillion, Chinese	1 35, gold
" English	82½c., gold
" Trieste	1 10 "
" American, Common	23c
White Lead, American, pure dry	10c
" " in oil	10½c
White, Paris, English, prime	in bbls. 2¾ @ 2¾c
Yellow Ochre, French	2¾ @ 2¾c
" " " in oil	asst'd cans, 11c; kegs, 8½c
" Vermont	in casks 1¾c
Yellow Chrome	17 @ 27c
" " in oil	18 @ 28c
Zinc White, American No. 1 dry	9c
" " 1, in oil	11c
" French (Paris)	11c
" " in oil	12c

Oils.

Linseed Raw	₱ gal. casks, 59c, bbl., 60c
" Boiled	" 64c. " 65c
Whale, Crude	"
" Bleached Winter	" 75c
Sperm, Crude	obl. 1·67
" Winter, unbleached	1·90
" Bleached	2 00
Seal, Extra Refined	"
Lard, Pure Winter	" 1·15
" Spring	" 1·05
Cotton Seed, Crude	" 62c
" Southern Yellow	" 67c
" White	"
Neatsfoot, Winter	70c @ $1·10
Natural Lubricating	38c @ 40c

Sundries.

Asphaltum	5c
Benzine	₱ gal. 16c
Chalk	₱ ₱ 5c
" Block	" 6c
Dryer, Patent, Am'n	asst'd cans, 10·8c.; kegs, 9c
" " English	" 11c.; " 9c
Flocks	"
Frostings	9c
Glue, White	33 @ 44c
" Sheet	28 c
Glaziers' Points, Zinc	9c
Gum, Copal	36c
" Damar	27c
" Shellac, English	95c
" " dark	60c
Litharge	9½c
Pumice Stone, selected Lumps	4 @ 6c
" powdered	4c
Putty in bladders	3½c
" in bulk	3c
Rotton Stone, soft, English	8c
Spirits Turpentine	39c
Whiting, Spanish	¾c

Glass.
Single Thick.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$11 00	$10 50	$10 00	$9 50
8 x 10 to 10 x 15	12 00	11 00	10 50	10 00
11 x 14 to 12 x 16	13 50	12 50	11 50	10 75
11 x 18 to 14 x 24	14 00	13 00	12 00	11 25
15 x 24 to 15 x 32	17 00	16 00	14 00	13 00
16 x 32 to 20 x 30	18 00	16 50	14 50	13 50
22 - 30 to 15 x 38	19 50	18 00	16 00	
20 x 34 to 22 x 36	20 50	19 50	17 00	
24 x 36 to 24 x 40	23 00	21 50	18 00	
24 x 42 to 28 x 42	25 50	22 50	20 50	
26 x 46 to 30 x 48	26 50	23 50	22 00	
3 x 50 to 32 x 52	28 00	25 50	23 00	
32 x 54 to 34 x 56	24 00	27 00	24 00	
34 x 58 to 34 x 60	31 50	29 00	26 00	
36 x 60 to 40 x 60	35 00	32 00	29 00	

Double Thick.

SIZES.	I.	II.	III.	IV.
6 x 8 to 7 x 9	$19 50	$18 50	$17 50	$16 50
8 x 10 to 10 x 15	21 00	19 50	18 00	17 50
11 x 14 to 12 x 16	23 00	21 00	20 00	18 50
11 x 18 to 14 x 24	24 50	22 00	21 00	19 50
15 x 24 to 15 x 32	30 00	28 00	25 00	
16 x 32 to 20 x 30	32 00	30 00	26 00	
22 x 30 to 15 x 38	34 00	32 00	28 00	
20 x 34 to 22 x 36	37 00	34 00	30 00	
24 x 36 to 24 x 40	40 00	36 00	32 00	
24 x 42 to 28 x 42	44 50	40 00	36 00	
26 x 46 to 30 x 48	46 50	42 00	38 00	
30 x 50 to 32 x 52	48 50	44 50	40 00	
32 x 54 to 34 x 56	50 00	46 50	42 00	
34 x 58 to 34 x 60	55 00	50 00	46 00	
36 x 60 to 40 x 60	60 00	55 00	52 00	

Sizes above—$15 per box extra for every 5 inches. Discount 60&10 @ 60&15 %
All sizes above 52 inches in length, and not making more than 81 united inches, will be charged in the 84 united inches bracket. An additional 10 per cent. will be charged for all Glass more than 40 inches wide.

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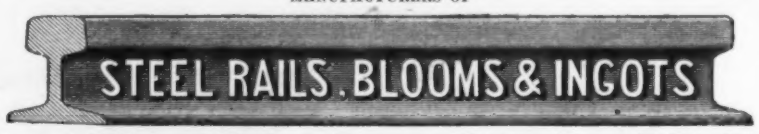

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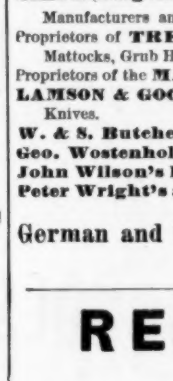

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2	3	Elevation and Plan of Outhouse.
3	4	Front Elevation, Section and 1st Floor Plan of Cottage, with Tower and Bay Window.
3	5	Side Elevation and 2d Floor Plan.
3	6	Side Elevation, Sections and Attic Plan.
4	7	Front Elevation of Dwelling, with Dormer Window and Carriage Porch
5	7	Front Elevation of Dwelling, with Bay Window and Tower.
6	8	Side Elevation, 1st and 2d Floor Plans of a Two-Story and Mansard Roof Homestead with 9 Rooms and Bay Windows at front and side.
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7	10	Front and Side Elevations, Section and Plan of Chamberlin Library.
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9	14	Side Elevation.
9	15	Second Story and Attic Plans.
10	16	Front Elevation of a One-Story and French Roof Homestead, with Bay Window, Tower and Carriage Porch.
10	17	Side Elevation and 2d Floor Plan.
10	18	Main Floor Plan.
11	19	End Elevation and Plan of Wayside Chapel, with Catharine Wheel Window, erected near Nyack, N. Y.
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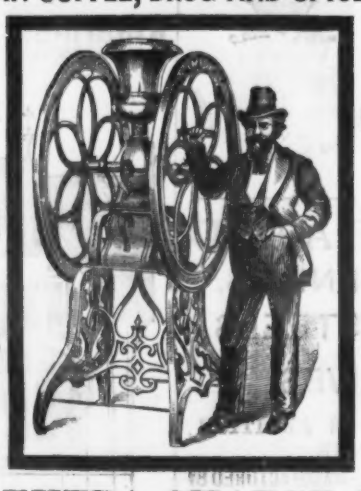

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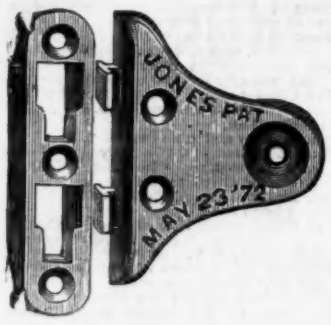

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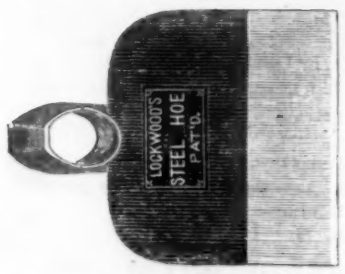

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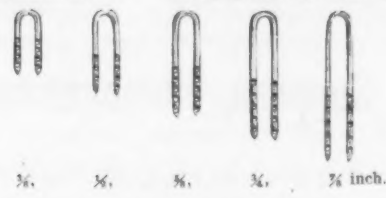

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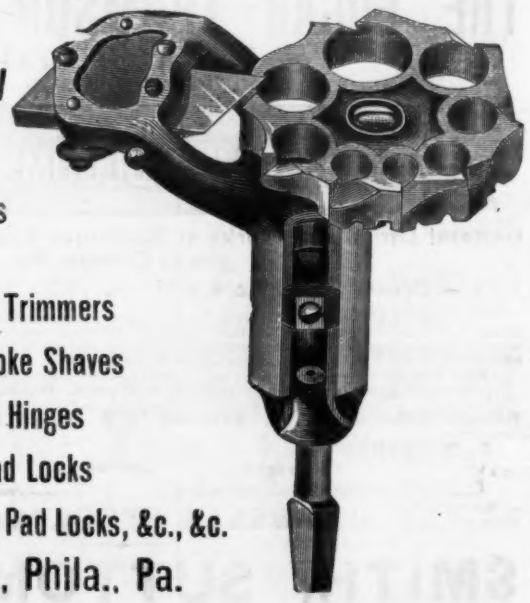

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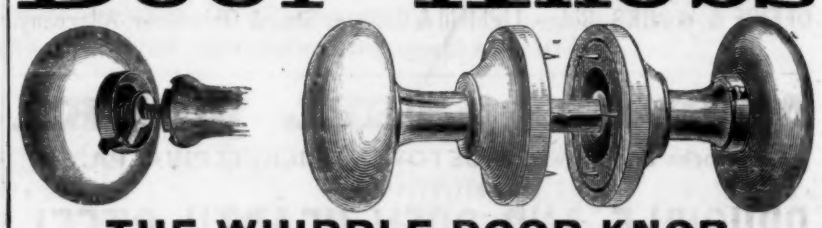

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" Back Strap.....dis 40&5 %
Oliver Ames & Sons.....dis 20 %
Brady Shovel Co.....dis 20&5 %

Sad Irons.—Richmond (polished face).....per lb. 3¼c
Richmond (nolished face)..... by the cask " 3
Stone.—Arkansas Oil, No. 1.....₩ ℔ $
Turkey Oil, No. 1.....
Washita Extra.....net " 25c
" No. 1.....net " 20c
" " 2.....net " 15c
Hindostan 8 inch.....
Screws.
United States and others in Combination.....dis 40 %
Keystone, not in Combination.....dis 40&10 %

Spoons.—
Plated.....dis 40 @ 40&5 %
Britannia, Boardmans (new list).....dis 50&10 %
" Parkers (old list).....dis 50 @ 50&10 %
German Silver.....dis 30 %
" Light.....new list dis 35 %
Lalance & Grosjean Iron.....dis 10 %

Springs.—Gray's Door.....dis 60&10 %
Torry's Door.....dis 60&10%

Stocks and Dies......dis 10&5 %

Stove Polish.—Gem.....₩ gross, $5 00
Onyx....." $5 00

Try Squares.—Winterbottom.....dis 10 @ 15 %
Stanley Rule and Level Co.....dis 45&10 %
Willits Thrall, No. 2.....dis 30&10 %
Disston's No. 2.....dis 40 %

Tacks, &c.—Half Weight Tacks.....dis 25 @ 75&10 %
" " by the case...dis 72½&7½ %
Trunk, Clout and Finishing Nails.....net to 10 %
" " by the case.....dis 7½ %

Traps.—Genuine Oneida—Newhouse list.....dis 20 %
Imitation " " .....dis 30 @ 35 %

Vises.—Solid Box, currency.....₩ ℔ 13½c

Wrenches.—Coes Genuine.....dis 40&5 @ 47&10 %
Coes Imitation Wrought Bar.....dis 50&10 %
" " Malleable Bar.....dis 60&10 %
" " (Kellogg) Malleable Bar.....dis 65&10 %
Tafts Pattern (Wrought Bar).....dis 70 @ 70&10 %
Philadelphia Tool Co.'s Pat. Duplex.....dis 25 %
" " " Improved Baxter.....dis 25 %
" " " Adjustable Fork.....dis 25 %

Wire.—No. 0 to 18.....(Advanced April 24th)..dis 47½ %
No. 19 to 26.....dis 50 %
No. 27 to 28.....dis 52½ %
Coppered 0 to 12.....dis 15 @ 20 %
Tinned Broom Wire.....dis 35 %
Galvanized Wire No. 1 to 18.....dis 40 %

BUFFALO.

Reported by Messrs. Sidney Shepard & Co.
February 19, 1876.

Augers—Snell Mfg. Co.....dis 25 %
Axes—Francis.....
Bits, Auger—Snell Mfg. Co.....dis 25 %
Phœnix.....dis 40 %
Bells, Cow—Yaw's Genuine.....dis 25 %
Braces—Bit, Spofford's Patent.....dis 50 %
Brads, Cut.....dis 50&10 %
Boards—Stove, Brooks' Pat.dis 35 % 4 mos.; 35&5 % 30 dys
Belting—Rubber.....dis 40 %
Leather, new list, oak tanned.....dis 20 %
Brick—Bath (box of 2 doz) Best English.....$1 25
Can Openers—Sprague's.....dis 55&10 %
Cases—Parlor Coal Hod.....dis 15 %
Chalk—White, Carpenter's.....₩ gross, 57c
Red, Carpenter's....." 90c
Chisels—Firmer Socket.....dis 60, 10&10 %
Framing Socket.....dis 60, 10&10 %
Corner Socket Chisels.....dis 60, 10&10 %
Slick's Carpenters'.....dis 60, 10&10 %
Castings—Malleable.....₩ ℔ 9½c
Cutters—Meat, "Hales".....₩ ℔ 9½c
Egg Beaters—"Peerless".....per doz $3 00
"Centripetal".....per doz 5 00
Elbows—Corrugated.....dis 15 %
Adjustable.....dis 20 %
Files—Maltchoes Bros.....dis 50 %
Fluters—Geneva Hand.....₩ doz. $15 00
Freezers Ice Cream—"Champion".....dis 33⅓ %
Hammers—Henry W. Kip's.....dis 12 %
Hinges, Gate—Shepard's.....dis 30&10 %
Hinges—Window Blind—
Shepard's and Standard.....dis 70 %
Hogs, Coal—Plain, Black and Galvan'd...new list dis 15 %
Funnel, Black and Galvanized....." dis 15 %
Fancy and Helmet....." dis 15 %
Sad Irons.....dis 15 %
Kettles—Brass.....35½c
Copper, "Hand Made".....₩ ℔, 45c
Enameled.....38c. @ 40c.
Knives, Drawing—Oval No. 1.....dis 50&10 %
Razor Blade.....dis 60, 10&10 %
Lanterns "Peerless."....No. 1 3 10
₩ doz $26 00 $10 50 $13 75 dis 10 %
Tuquiar.....$11 00
" with Guards.....11 50
Machines—Apple Paring, "Keystone".....7 75 ₩ doz
Machines—Boring, Snell's.....dis 20 %
Mills, Coffee—Box and Side, common.....dis 30 %
Box Union and Eagle.....dis 15 %
"American".....dis 20 %
Molasses Gates—"Self Measuring".....dis 20 %
Nails—Clout and Finishing.....dis 10 %
Shoe.....dis 10 %
Cut, "Chesapeake," 10d.....$3 10
Horse, Ausable.....No. 5 7 8 9 10
30 27 25 24 23 22c
" " Pointed & Polished.....add 1c ₩ ℔
" " 1000 lbs.....dis 5 %
" Clinton.....No. 5 7 8 9 10
21 19 18 17 16c
Packing—Rubber.....dis 50 %
Paint—White Lead, U. S. Gov't.....₩ ℔ 8½c
Pans—Dripping.....₩ ℔ 10c
Rivets—Iron, Black and Tinned.....dis 50 %
Screws—"American Screw Co"—
Flat Head, Iron.....dis 40 %
Flat Head, Brass.....dis 40 %
Sieves—Wood, Hoop iron.....$1 35
Tinned.....1 75
Skates and Straps—White's.....dis 30 %
Spoons, Iron Tinned.....dis 30 %
" by the case.....dis 40 %
Plated Rogers' A No. 1.....dis 20 %
Britannia.....dis 40 %
G. S. Hall, Elton & Co.....dis 50&5 %
Squares—Steel and Iron.....dis 30 %
Scales—Buffalo Scale Works.....new list 50 %
Fairbanks.....dis 25 %
Stove Polish—Gem.....₩ gross, $4 50
" Dixon's.....6 00
Tacks—Half Weight Am. Iron.....dis 75&10 %
Tea Trays.....dis. 15 %
Tools—Machinists' and Tinmens'.....dis 10 %
Vases—Palace Coal.....dis 15 %
Vises—.....
Parallel, Buffalo...Old pattern, dis. 30 %; new, do.dis 20 %
Ware—French, Tinned and Iron.....dis 20&10 %
Stamped and Japanned.....
Cast Iron Hollow.....dis 10 %
Wire—Bessemer Steel.....dis 45 %
Tin Plates.—Add for each X.....dis 10 %
10x14, IC. Charcoal.....$9 00 | 14x20 C. terne.....$8 50
12x12, " ... 9 75 | 30x78 C. " ... 18 50
12½x17, " ... 8 50 | 30x28 X. " ... 23 00
14x20, " ... 10 00 |
Pig Tin—Straits.....24c @ 25c
Bar Tin.....26c
Solder—No. 1, Crook's.....16 c
Sheet Zinc—
"Lasalle".....₩ 100 ℔ casks
$10 50 10 50 ₩ 100 ℔s
Sheets.....$10 50
Babbitt Metal.....₩ ℔ 12c
Iron Wire—Bright and Annealed.....dis 45 %
Coppered.....dis 40 %
Tinned.....dis 25 %
Tinned Broom, { Nos. 20 21 23 } .....dis 35 %
{ 20c 21c 21c }
Copper—Sheathing 14 @ 18 oz.....₩ ℔ 30c
Planished.....₩ ℔ 37c @ 39c
Bottoms.....₩ ℔ 31c
Bolts.....₩ ℔ 31 @ 33c
Brazers' Sheets.....₩ ℔ 31 @ 33c
Sheet Iron.—
18 Common.....$3 80
24 Common.....4 00
26 Common.....4 20
24 W. D. Wood & Co., Smooth Finish.....4 75
Planished..... A. B.
Gen. Russia, No. 1 stained.....13c 11c
" clean.....14½c
Galvanized.....dis 30 %

CINCINNATI.

Reported by Sellew & Co., Importers and Jobbers Metals, No. 214, 216 and 218 Main street.

Tin Plate.—I. C. 10x14 Charcoal.....$8 50 @ 10 00
I. X. 10x14 Charcoal.....12 00 @ 12 50
I. C. Terne 14x20.....8 25 @ 9 00
I. C. Terne 20x28.....20 50 @ 21 00
I. C. 30 inches Continuous.....21 00
Block Tin.—
Pig.....₩ ℔ 25c
Bars.....₩ ℔ 26c
Solder.—
A 1.....₩ ℔ 16c
Roofing.....₩ ℔ 17c
S. & Co.....₩ ℔ 19c
Lead.—Pig.....₩ ℔ 7½c.
Bar.....₩ ℔ 8½c
Copper.—
Ingot.....₩ ℔ @ 24c
Planished....." @ 36c
Sheathing....." @ 31c
Copper Drops....." @ 34c
Sheets, 6 to 7 lb....." @ 37c
" 8 to 9 lb....." @ 35c
" 10 to 12 lb....." @ 33c
" 13 lb. up....." @ 31c
Copper Bottoms.....@ 33c
Zinc. Cask, 500 to 1000 lbs.....₩ ℔ 10½ @ 10¾c
Case, 100 lbs....." 10¾ @ 11 c
Slab.....7¼c
Brass.—Roll, No. 6 to 30.....₩ ℔ 30c
Roll, No. 30 to 38....." 35c
Wire, No. 0 to 20....." 35c
" 20 to 25....." 40c
Babbit Metal.—Sellew & Co.....35c
Allens'....." 20c
Market....." 13c
Antimony.....₩ ℔ 17c
Bismuth.....₩ ℔ $4 00
Nickel.....₩ ℔ $3 50
Russia Iron.—Bundle.....₩ ℔ 16c
Less than bundle.....₩ ℔ 18c
No. Stained.....₩ ℔ 15c @ 16c
Sheet Iron.

	Com. B.	Smooth Fin.	S. L. U.	Smooth D Re'fd.
15 to 20	4c	5 10c		7 10
22 to 24	5 30c	5 30c		6 90
26	4c	5 50c		7 05
27	4 20c	5¼c		7¼
30	5¼c			

Galvanized Iron.—Full bundles.....dis 30 %
Nos. 18 to 20.....12c | No. 26.....14c
22 to 24.....13c | 27.....15c
Bar Steel.—Silver, ₩ ℔ 16c Crescent, 21c.
Iron Wire.....dis 35 %
Enameled Ware.....dis 50 %

PITTSBURGH.

The following are the Card rates of Lewis, Oliver & Phillips, H. B. Newhall, 11 Warren St., New York, Agent. Iron, standard list assorted sizes, for large orders, specifications to include Bands, small Rounds and Ovals, 7-50c. rate, 2 % off net.
Flat Rail (1¾x¼), punched and coun'sunk..4¼c ₩ ℔ net
Iron Wedges.....4¾c ₩ ℔ net
Norway Nail Rods.....8¾c ₩ ℔ net
Crow Bars (in ordering please state whether "Wedge" or "Pinch" point).....4¾c ₩ ℔ net
Beetle Rings.....8 c ₩ ℔ net
Fence Pickets—
¾ round, bent to shape, 25c ₩ ft. of fence, less 15 % off net.
Discount off Standard List.
Carriage and Tire Bolts.....75 % off net
Carriage and Tire Bolts delivered on cars or boats in Pittsburgh.
Stove Bolts.....20 % off net
Machine and Square Head Bolts.....40&10 % off net
Coach and Lag Screws.....40&10 % off net
Bolt Ends.....40 % off net
Pat. Hot Pressed Square and Hexagon Nuts, small sizes, from 3-16 to ⅜ in.....8¼c ₩ ℔ off net
Pat. Hot Pressed Square and Hexagon Nuts, large sizes, from 7-16 to 1⅛ in.....6¾c ₩ ℔ off net
Washers, all made from new band iron, small sizes, from 3-16 to ⅜ in.....9¾c ₩ ℔ off net
Washers, all made from new band iron, large sizes, from 7-16 to 1⅛ in.....7¾c ₩ ℔ off net
Nuts and Washers in 25 lb. boxes, ¼c ₩ ℔ ex. Nuts and Washers in lots less than one keg each size, ½c ₩ ℔ ex. Nuts and Washers in 5 lb. boxes, 1c. ₩ ℔ ex. net prices.
Standard Caps, for Plows.....5¾c. ₩ ℔ net
Iron Harrow Teeth, in lots of 1 keg or more, packed in 200 lb. boxes, 1 in. diam. 3¼c ₩ ℔ net; ⅞ in. diam. 3¼c ₩ ℔ net; ¾ in. diam. 3¼c ₩ ℔ net.
Patent Headed Harrow Teeth, packed in boxes ½c ₩ ℔ ex
Skein Bolts, in bulk, in lots of 1 keg or more, ⅝ in. diam. 5c ₩ ℔ net; 9-16 in. diam. 6c ₩ ℔ net; ½ in. diam. 7c ₩ ℔ net. 1c ₩ ℔ extra when less than 1 keg of each size is ordered.
Strap & T Hinges...33¼&10 % off net, delivery as custo'ry
Screw Hitching Rings.....$5 25 ₩ 100 net
Bridge and Roof Bolts—
1 to 2 in. diam. over 8 ft. long.....₩ ℔ 3¾c net
1 to 2 in. diam. from 4 to 8 ft. long.....4 c net
1 to 2 in. diam. from 1½ to 4 ft. long.....4¼c net
⅝, ¾ and ⅞ in. diam. over 4 ft. long.....4½c net
⅝, ¾ and ⅞ in. diam. from 1½ to 4 ft. long.....5 c net
Bridge bolts with upset ends.....¼c. ₩ ℔ extra
Wrought iron plates, punched.....4¼c. ₩ ℔ net
Cast Iron Washers.....₩ ℔ 3¼c net
Duck Nest Tuyere Irons.....$14 50 ₩ doz net

WAGON HARDWARE.

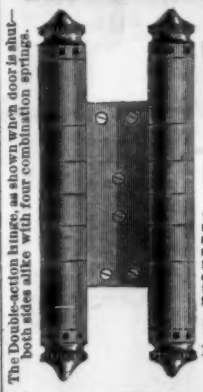
Wagon Box Strap Bolts—
10 in. long by 7-16 at Screw End, ₩ set of 8 bolts..45c
12 " ½ " " 8 " ..55c
10 " 9-16 " " 8 " ..65c
12 " 9-16 " " 8 " ..70c
14 " 9-16 " " 8 " ..80c
10 " ⅝ " " 8 " ..80c
13 " ⅝ " " 8 " ..90c
14 " ⅝ " " 8 " ..90c
16 " ⅝ " " 8 " ..1 00
18 " ⅝ " " 8 " ..1 10
20 " ⅝ " " 8 " ..1 20
5c ₩ set for each additional inch over 14 in. All lengths made.
In ordering Box Strap Bolts please give diameter at Screw End.
Wagon Box Rods, narrow track, each.....15c
" " wide track, each.....17c
Single Tree Irons, ₩ set of four pieces.....30c
Wrought Iron Bolster Plates, 2¾ in. wide, ₩ set.....45c
" " " 3 " " 50c
" " " 3¼ " " 55c
" " " 3½ " " 60c
Wagon Brake Ratchets, each.....14 c
" " " finished with guard, each..16 c
Wrought Hammer Straps, heavy pattern, each.....13 c
" " " light " each.....12 c
" Rub Irons, each.....9 c
Stay Chain Hooks, each.....5¼c
Double and Single Tree Clips, figure 1, each.....8 c
" " " 2, each.....9 c
" " " 3, each.....11 c
Axle Clips, Round Part ⅝, Flat Part 1¼, each.....8c
Wagon Clevis, including Pin, complete, each.....10c
Pole Caps, each.....24c
Single Tree Hooks, Nos. 1 and 2.....4½c
Strap Bolts, Rods, Single Tree Irons, Bolster Plates, Brake Ratchets, Hammer Straps, Rub Irons, Stay Chain Hooks, Clevis and Pin, Clips, Single Tree Hooks, and Pole Caps, in lots of 50 sets.....dis 15 %
Wagon Box Staples, 1¼ to 2¼ in. to clinch. ₩ 1000 $11 00 net
" " " Bevel Box Iron, to rivet on. ₩ 1000 7 50 net
Neck Yoke Eyes, each.....4¼c net
" " with ⅜ rings, each.....7¼c net
King Bolts, ⅝, 1, 1⅛, and 1¼ in. diam.....₩ ℔ 4¼c net
Wagon Rivets, ex. large, flat, oval and steeple head, ¼ in. diam. all lengths.....8¼c net
Wagon Rivets, 3-16 in. diam., all lengths.....9¼c net
" " ¼ to 1 inch long.....₩ ℔ 1c extra
" & Nails, in 5 ℔ paper boxes.....1c extra
" " in 25 ℔ wood.....¼c extra
Wagon and Hinge Nails, ¼ in.....₩ ℔ 17 c net
" " " 3-16 in.....19 c net
Wagon Rivets and Nails, in less lots than one keg each size.....½c extra
Double Tree Plates.....9c net
Coupling " .....5c net
Tongue " .....8¼c net
Neck Yoke Plates.....10½c net
Tongue Cap Iron, 1¾, 2 & 2¼ in. wide, same price ₩ ℔ as Band Iron.
Wagon Chains, Stay, Lock and Tongue, 5-16 in. ₩ ℔ 10¼c net. ¼ in., 11¼c. net
Above prices are free on board cars in Pittsburgh. Subject to change of market, without notice.

DETROIT.

(Reported by Messrs. Jewett & Root.)
March 4, 1876.

Tin Plate.—Best Charcoal
IC. 10x14.....$ 9 25
IX. 10x14.....11 75
XX. 10x14.....14 25
IC. 12x12.....9 75
IX. 12x12.....12 25
IC. 14x20.....10 25
IX. 14x20.....12 75
XX. 14x20.....15 25
XXX. 14x20.....17 75
XXXX. 14x20.....20 25
DC. 100 Plate.....9 75
DX. " 11 25
DX. " 13 75
DXX " 16 25
DXXX 100 Plate..18 75
IX. 14x14.....18 00
IC. 10x14 W.....9 75
IX. 10x14 W.....11 25
Roofing Tin.—Best Char.
IC. Terne, 14x20.....$ 8 75
IX " 14x20.....11 25
IC. Terne, 20x28.....18 50
IX. " 20x28.....23 50
Coke Tin.—
IC. 10x14 Coke.....$ 9 00
IX. 10x14. Coke.....11 50
IC. 14x20. " 10 00
Solder.—No. 1.....16c
No. 2.....15c
Pig Tin.—
Large Pigs.....24c
Small Pigs.....25c
Bars.....26c
Bright Wire.
63 lbs. in bdl.....dis —
Copper.—
Sheathing.....33c
Copper Bottoms.....31c
Planished Copper.—
Sheathing, 14x48.....41c
Boiler Size, No. 7.....43c
" " No. 8.....42c
" " No. 9.....42c
Sheet Iron.—
No. 18 Am. Com.....4 00
No. 24 Am. Com.....4 20
No. 26 Am. Com.....4 40
No. 27, Am. Com.....4 60
W. D. WOOD'S & CO.'S SHEET IRON.—
Nos. 15 to 20 Smooth $5 00
" 21 to 24.....5 20
" 25 & 26.....5 40
" 21 to 24 Charl..6 70
" 25 & 26 " ..6 90
RUSSIA.
Genuine.....17c
Imitation.....14c

Buy House's Double Action GIANT SPRING HINGE



The Double-action hinge, as shown when door is shut—both sides alike with four combination springs.

FOR
Banks and Offices,
CHURCHES,
School Houses,
And all
Public Buildings.

It has no equal. It swings the door both ways, forms a solid attachment on each side. Has four combination springs acting together, cannot settle nor sag. Will carry any weight, and is decidedly the Finest, Strongest, and Best made.

HOUSE BROS.,
Patentees & Manufacturers,
194 Broadway, N. Y.

TACKLE BLOCKS
BURR & CO.,
Manufacturers of Waterman and Russel's
Patent Iron Strapped Blocks,
ALSO, MANUFACTURERS OF
ROPE STRAPPED BLOCKS.
81 PECK SLIP NEW YORK.

WE OFFER
COMMON AXLES, at 4 5-8c. per lb.
SOLID COLLAR, CASE HARDENED, CHILLED BOX AXLES, SUPERBLY FINISHED,
At 8c. per lb.

SHORT, SOLID COLLAR, HALF PATENT AXLES,

⅝ to 1 in.	1⅛ in.	1 ¼ in.	1⅜ in.	1½ in.
Per set, $2 20,	$2 80,	$3 40,	$4 80	$6 0

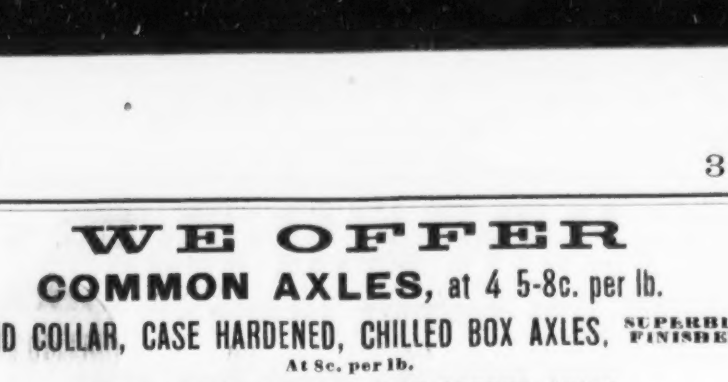
LONG, SOLID COLLAR, HALF PATENT AXLES,

⅞ to 1 in.	1⅛ in.	1 ¼ in.	1⅜ in.	1½ in.
Per set, $3 00,	$3 60,	$4 40,	$6 00	$8 00.

And all other kinds at proportionately low figures.

BLACK SPRINGS, 1 1-2 in. & larger, 10 1-2c. per lb.
Bright, Oil Tempered and other qualities at corresponding rates.

GUY C. HOTCHKISS, FIELD & CO.,
85 First St., Brooklyn, E. D., and New York City
Manufacture Carriage Materials, Axles, Springs, Blacksmiths' Supplies, Bolts, Wood Work, Trimmings, &c.
IMPORTERS AND DEALERS IN
IRON AND STEEL.



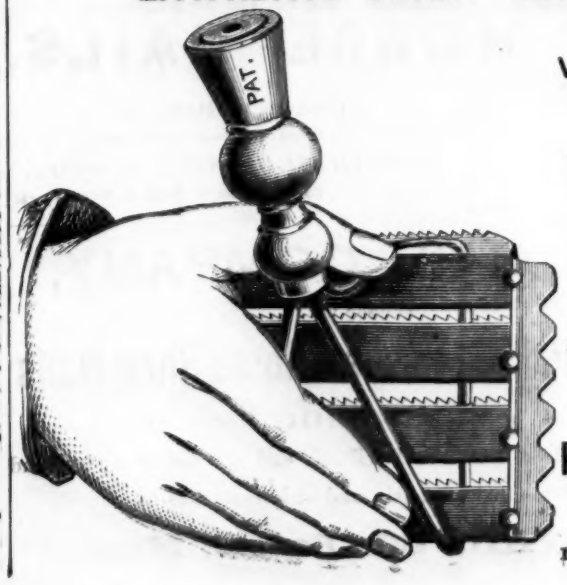
FOR MELTING ALL KINDS OF METALS,
And Manufacturers of
Sunny Side Stove Polish.
Lumber Pencils, Foundry Facings and Lubricating Plumbago.
STROW, WILE & CO.,
Nos. 1324, 1326, 1328, 1330, 1332 & 1334 Callowhill St., Phila
GENERAL AGENTS:
Messrs. HALL & CARPENTER, 709 Market St., Phila.

Belting FOR Centennial Purposes

Parties intending to exhibit machinery, &c, at the Centennial Exposition, can save freight and trouble by purchasing the Belting they may require from the undersigned in PHILADELPHIA. Either Leather or Rubber Belting of the best quality will be furnished at the lowest market rates, and delivered directly to the door of the Exposition building. Satisfaction guaranteed.

CHARLES W. ARNY,
Manufacturer,
148 North Third Street, - - PHILADELPHIA.

THE PERFECT COMB,
MADE BY THE
LAWRENCE CURRY COMB CO.



WITH
WIRE BRACES
All Wrought Iron.
The BEST, STRONGEST and Most DURABLE COMB Ever Made.
Patented: May 5, 1874
Nov. 17, 1874
Aug. 24, 1875
FOR SALE BY
Hermann Boker & Co.
101 & 103 Duane St., N. Y.

BILLINGS & SPENCER CO.

MANUFACTURERS OF

CLAMP, DIE AND COMMON

LATHE DOGS.

Vienna, 1873

Forged from Bar Steel And Hardened

Under Billing's Patent Process.

For Progress

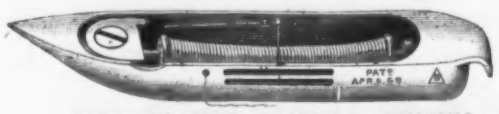
FIRST CLASS ARTICLES,

and something that every machinist and Tool Maker will appreciate. Also, all descriptions of **Wrought Iron & Steel**

DROP FORGINGS.

For Machine Handles, Lathe Wrenches, Spinning Rings, Marlin Spikes, Clinch Rings, Thumb Screws, Thumb Nuts, and Pa of Drill Chucks, Sewing Machines, Gun-, Pi and

Machinery Generally.

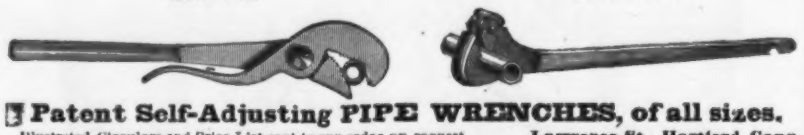


TRADE B MARK.

THE BILLINGS PATENT SEWING MACHINE SHUTTLE,

Thirty Varieties now made, Forged Solid from Bar Steel and Cold Pressed. Also,

Barwick Wheatcroft



Patent Self-Adjusting PIPE WRENCHES, of all sizes.

Illustrated Circulars and Price List sent to any order on request. Lawrence St., Hartford, Conn.

EDWARD PHELAN,

No. 113 Chambers & 95 Reade Streets, New York,

Manufacturer of AMERICAN HARDWARE.

Coes & Taft's Pat. Wrenches.
Axe Pick, Sledge & Hammer Handles.
Gimlets and Gimlet Bits.
Gauges and Auger Bits.

Cocoa Nut Drippers
Wire Selves.
Scale Beams.
Patent Tap Borers.
Cortlandt Horse Nails.

Maguire's Wr't Iron Goods.
Shattuck's Platform Counter Scales.
Yaw's Cow Bells.
Axes, Picks and Hatchets.

The Cowles Hardware Co.,

UNIONVILLE, CONN., Manufacturers of

HARDWARE & HOUSE-FURNISHING GOODS.

GEO. DUNHAM, Prest. G. S. KNAPP, Treas. MARTIN COWLES, Sec.

Screw Drivers of all varieties, Box Scrapers, Box Openers, Garden Hoes, Garden Trowels, Border Knives, Mincing Knives, Fish Turners, Butter Knives, Cake Turners, Cleavers, Hammers, Carpet Stretchers, Tack Claws, Marking Awls, Carpenters' Awls, Belt Awls, Ice Awls, Carriage Jacks, Nail Sets, Bush Hooks, Ice Axes, Ice Tongs, Patent Mouse Traps Vegetable Slicers, Bit Braces, Butts and Spiral Springs, Ferrules, Ham Tryer, Ham Stringers, Oyster Knives, Cold Chisels, Handles, Solid and Prick Punches and

IMPLEMENT SCREW DRIVERS.

Catalogues and Circulars sent on application.

Ausable Horse Nail Co.

MANUFACTURERS OF

HAMMERED,

Hammer Poin ed, Polished & Blued

HORSE NAILS,

FROM

BENZON IRON.

Orders promptly filled at lowest market rates.

ABRAHAM BUSSING, Secretary,

35 Chambers Street, New York

GLOBE NAIL COMPANY,

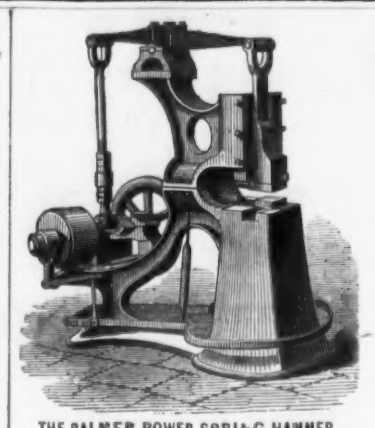
MANUFACTURERS OF

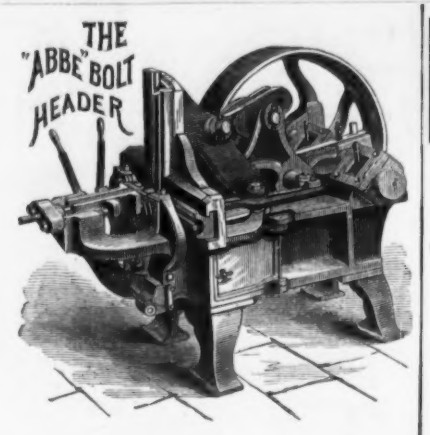
Pointed, Polished & Finished Horse Shoe Nails

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

GLOBE NAIL CO., Boston, Mass.





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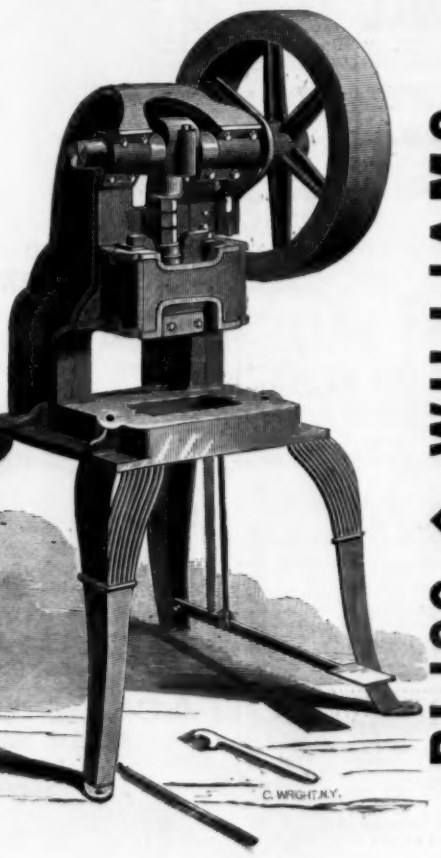

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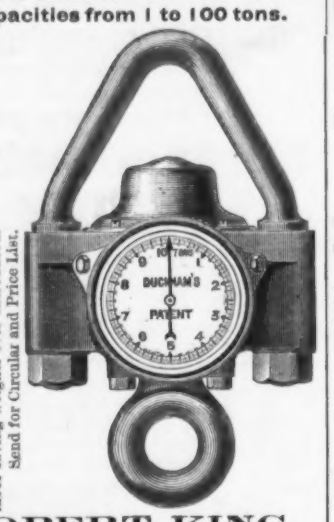

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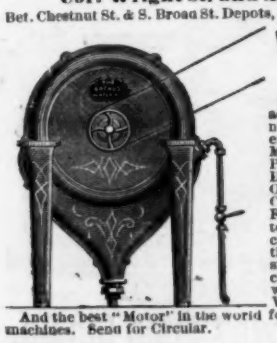

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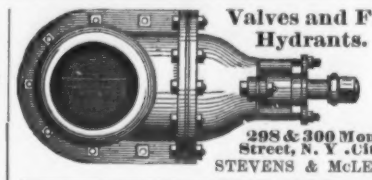

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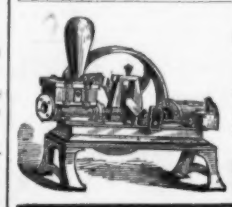

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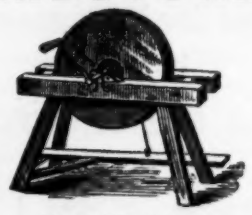

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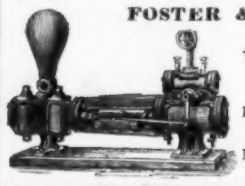

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Sand Paper.....dis 15 & 5 %
M. B. & D.....0 to 2, $4·25; 2 to 3, $4·75
Saws.—*Hand and Panel*—
Wheeler, Madden & Clemson's, same list as "Disston's".....dis. 15&5 %
Disston's.....dis. 12½ %
Cross Cut—
Wheeler, Madden & Clemson X Cuts.....per ft., 37c
" " " "Star" X Cuts. " 30c
" " " Champion X Cut. " 50c
" " " One Man X Cut...each, $2·25
Boynton's genuine Lightning X Cut.....per ft., 50c
" " " One Man X Cut...each, $2·00
Circular—Wheeler, Madden & Clemson's.....dis. 25 %
Mill—.....dis. 25 %
Screws.—Am. Screw Co., new list Sept. 1st.....dis 40 %
Aiken's.....dis 40 %
Scythe Stones.—
"Willoughby Lake," first quality.....₩ gross $6·50
" " second quality....." 3·00
Shovels.—O. Ames.....dis 20 %
M. B. & D.....dis 20 %
Snow, Malleable Iron Tip, D Handle—Agents for New England.....$6·50
Snow, Malleable Iron Tip, long handle—Agents for New England.....5·50
Sifters.—Coal, Rice, &c.....$12 00
Spading Forks.—W. C. & Co.....dis 30 %
Stone Pickers.—"Partridge," original...₩ doz $15 00
Tools.—Alden's Pattern, 20 in set; Parr's, 17 5, per doz
Traps.—Oneida.....dis 25 %
Blake's.....dis 50 %
Vises.—K. F. & Co.'s Solid Box Blacksmith.....₩ lb 13c
Parker's Parallel.....dis 10 %
Backus.....dis 25 %
"Howards." Parallel.....dis 20 %
Wardrobe Hooks.—Wire to drive.....₩ gross $1 00
Weather Strips.—"Harmon's".....per doz $5, dis 10 %
Weights.—Window Weights.....₩ lb 1½c
Wedges—Axe.....₩ doz 35c
Wire.—
Eureka, in spools, No. 28 to 40 assorted...₩ gross $3 50
Wire Netting.—Clinton Wire Cloth Co., Green, Drab or Black.....₩ ft 5c
Wrenches.—Genuine Wrenches, G. A. Coes.....dis 40&5 %
Walton.....dis 50 %
Wringers.—

Novelty and Universal	Tub No. 2	Less than 2 doz, $72 00
		2 doz or more, 70 00
Bench A	less than 2 doz	$86 00; 2 doz or more $84 00
" B	" "	94 00 " " 92 00
" C	" "	110 00 " " 107 00
Eureka	" "	60 00 " " 58 00

Withington, Cooley & Co.—
Hoes, Rakes, Forks, &c.....dis 30 %

Boston Metal Market.

(Corrected by Fuller, Dana & Fitz, 110 North Street, Boston, Importers and Commission Merchants.)

December 18, 1875.

Iron.—Best Refined Bar Iron.....₩ ton $51 50
"Burden Best" " " " 85 00
Swedish Bar Iron.....gold " 110 00
Norway Shapes.....gold " 122 50
Norway Nail Rods.....gold " 130 00
Sheet Iron, American.....₩ lb 4½c
" " Galvanized.....₩ c
" " Russian.....gold " 13½c
Plate Iron, C. No. 1.....₩ 3½c
Iron Rails.....₩ ton $47 50
Steel Rails....." 72 50
Pig Iron, Foundry, No. 1 extra....." 25 50
" " No. 2 extra....." 23 50
" Gray Forge....." 21 50
" Scotch.....30 00 @ 32 00
Wrought Scrap Iron....." 31 00
Old Rails....." 28 00

Steel.—	₩ lb	German	₩ lb 9 c
Eng. Tool, gold	15½c	Spring	7½c
American Tool	14½c	Tire	6 c
" Mach	9 c	Sleigh Shoe	4½c
Bessemer	6½c	Toe Calk	7 c

Tin Plates.—₩ box gold | **Copper.**—₩ lb
I. C. Char. 10x14.....$7·75 | Ingot.....23½c
I. C. Coke 10x14.....6 00 | Bolt.....30c
Char. Roof. IC. 14x20. 7 25 | Sheathing.....30c
Coke " IC, 14x20, 6 25 | **Lead.**—₩ lb
METALS. | Pig.....7½c
Pig Tin.—₩ lb., gold | Sheet & Pipe.....8 1-10c
Banca.....24c | **Zinc.**—Sheet..₩ lb 10½c
Straits.....24c | **Spelter.**.....₩ lb 7½c
English.....19½c | **Antimony.** gold ₩ lb 15½c

ST. LOUIS.

Corrected weekly by Semple, Birge & Co.

Apple Parers.—Conqueror.....₩ doz. $1 75
Hudson's Rotary....." 7 75
Axes.—Wm. Mann's, Red Warrior.....₩ doz $10 25
Wm. Mann's, W. Stewart's.....10 25
" Handled.....$5 extra
" Double Bitted.....2 50
H. L. B. & Co.'s, L. & Co.....10 25
" Pioneer.....11 25
" James & Co.....10 25
Hunt's.....12 00
Axles.—"Jones, Henry & Co.'s" Patent Lubricating, Half Patent, Swelled Taper, Plain Taper and Concord Axles.....dis 15 & 5 %
Common Axles (Pat. Lubricating), 1¼ inch and upward.....₩ lb. 6½c.
do. less than 1¼ inch.....7 c.
Bellows.—dec. 81, St. Louis Make.....50c ₩ in. net
Bells.—Troy, Church, School and Farm Bells..₩ lb 40c
"Improved Amalgam Bronzed," 15 in., $2·10; 17 in., $2·85; 19 in., $4·10; 21 in., $5·25.....dis 10 %
Belting.—"Boston Belting Co.'s Rubber.....dis 40 %
"Bradford & Sharp's" Oak-Tanned Leather.....dis 3+ %
Bonts—Metallic, Sectional, Bond's Patent.....dis 10 %
Bolts.—Arms, Bell & Co.'s Carriage & Tire...dis 70&10 %
Arms, Bell & Co.'s Machine.....dis 40&10 %
Butts.—Western Butt Co.'s new list—
Narrow Fast Joint.....dis 2-&10 %
Broad Fast Joint.....dis 3 &10 %
" Loose " .....dis 45&10 %
Reversible.....dis 40&10 %
" Japanned and Silver Tipped.....dis 45&10 %
Loose Joint "Acorn" " .....dis 45&10 %
Churns.—Julian, No. 2, $7·00; No. 3, $7·50; No. 4, $8·50.....dis 20 %
Cider Mills.—
American Senior, $40·00; Am. Junior, $25·00.....dis 20 %
Corn Drill.—Campbell's Patent.....each $2·00
Corn Knives.—Dunn Edge Tool Co.'s Chip...₩ doz 5 00
Seymour Mfg. Co.'s Solid Steel Back.....4 00
Corn Shellers.—Sandwich Mfg. Co.'s—
Power Shellers.....dis 10 %
Hand Shellers.....Special rates
Cotton Gins.—The Carver, 10in. Saw, $4 a Saw.....dis 15 %
12 in. Saw, $4·50 a Saw.....dis 10 %
Crow Bars.—Steel Pointed.....₩ lb 6½c
Drag Saw Machines.—
Culver's Iron Drag Saw.....dis 10 %
Robinson's Patent Sweepstakes Drag Saw.....dis 10 %
Fanning Mills.—Nash & Cutt's.....dis 30 %
Feed Cutters.—Improved Burdick National.....dis 20 %
Sanford No. 1, $10 75; No. 2, $8 00.....net

Files.—Black Diamond, Mill.....$5 00 £ currency.
" Bastard.....5 00 £ currency.
" Taper.....5 00 £ currency.
Forges.—Keystone Portable Forge Co.'s.....dis 12½ %
Forks and Hoes.—
Auburn Mfg. Co.'s Hay and Manure Forks.....dis 30 %
" " Handle d Hoes.....dis 30 %
Garden Seed Drills and Wheel Hoes.
Allen's Double Wheel Hoe.....dis 15 %
" Planet Drill, Nos. 2 and 3.....dis 15 %
" Combined Drill and Wheel Hoe.....dis 15 %
Grinding Mills.—Challenge Feed Mills.....dis 15 %
Sedgebeer's Nonpareil Mills.....dis 15 %
Bradford's French Burr Mills.....net list
Hammers.—Masons' Hammers.....₩ lb 10c
Smiths' Hand.....20c
Handles.—No. 1 Fork, Hoe and Rake.....dis 20 %
No. 2 Fork, Hoe and Rake.....dis 40 %
Harrow Teeth.—1 inch iron.....₩ lb 4½c
⅞ and ¾ inch iron.....4¾c
Barbed or Headed.....½c extra
Hay and Cotton Presses.—
Dederick's Railroad.....net list
" Perpetual.....net list
Hay Knives.—
Dunn Edge Tool Co.'s.....₩ doz $15 00—dis 15&5 %
Lightning (Weymouth's Patent).....₩ doz $20 50
Horse Hay Fork.—Nellis' Harpoon.....$9·00 net
Horse Nails.—National Patent Pointed.....20c rates
National Patent Pointed, extra finished.....22c " "
Horse Powers.—Pitts or Carey's Patent.....dis 10 %
Wheeler's Railway.....dis 10 %
Sandwich Lever.....dis 10 %
Horse Rasps.—
"Black Diamond".....$5·00 to the £ currency
Horse Shoes.—
Rhode Island (Perkin's Pattern).....₩ keg, $5 50
" Mule.....6 50
" Trotting Shoes.....8 00
Tredegar Horse.....per keg $4·75
" Mule.....per keg 5·75
Hose.—
Boston Belting Co.'s Rubber Medium Sizes, dis 10&10 %
" " Small Sizes, Hydrant.....dis 40
Ice Tools.—W. T. Wood & Co.'s saws.....new list ne
W. T. Wood & Co.'s Chest Hatchets.....new list ne
" " Axes.....new list ne
" " Loading Tongs.....new list ne
" " Medium, Small and Family Tongs.....new list ne
" " Chisels, Hooks and Grapples.....new list net
Mattocks and Grub Hoes.—
Klein, Logan & Co.'s Mattocks.....₩ doz $11 75 @ 13 50
" " Grub Hoes, oval eye.....$ 8 25 @ 9 75
Money Drawers.—
Pierpont & Co.'s Excelsior.....per doz $39·00 net
Nails.—Wheeling Riverside Brand...$2·70 to $2·75 rates
Packing.—Boston Belting Co.'s Rubber, Plain..dis 30 %
Boston Belting Co.'s Rubber, Pure.....dis 25&5 %
" " No. 2 Plain.....dis 40 %
" " Round and Square....dis 10&10 %
Picks.—Klein, Logan & Co's Railroad and Clay.....₩ doz $8 50 @ 10 00
Klein, Logan & Co.'s Coal....." 7 45 @ 8 40
" " Pick....." 11 00 @ 13 85
" " Stone....." 14 40 @ 14 90
" " Tamping....." 14 75 @ 15 35
" " Miners' Drifting....." 9 75 @ 11 75
Plows.—Avery's Cast and Steel.....dis 30 %
Collins Cast Cast Steel.....new list net
Pekin Steel.....dis 30 %
Post Hole Augers.—Clark's Patent—
No. 1, ₩ doz. $27; No. 2, $30; No. 3, $32.....dis 30 %
Pulleys.—5 inch.....per doz $4·25 net
4 inch.....per doz 3·25 net
Nellis' Patent.....new list dis 15 %
Pumps.—
St. Louis, Farm, Patent Metal Lined...new list dis 50 %
Rakes.—Paddock's Premium Sulky.....$20 00 net
St. Louis Revolving 14 tooth.....5 00 net
" " 16 " .....5 25 net
" Hand Hay Rake.....dis 20 %
Reaper Knives and Sections.—
Geo. Barnes & Co.'s Knives.....dis 40 %
" " Sections.....dis 40 %
Road Scrapers.—Steel.....$9·50 net
Cast Iron.....dis 10&5 %
Sad Irons.—Monitor Brand, Silver Polished...₩ lb 14½c
Sash Weights.—Standard Solid Eyes.....₩ lb 4c
Saws.—Curtis & Co.....dis 10 %
Scythes.—Dunn Edge Tool Co.'s.....dis 30 %
Scythe Stones.—No. 1 Ind'n Pond ₩ gr's, $7 00
Extra Indian Pond. " 8 50
Premium " 10 50 dis 30 %
Diamond Grit " 18 00
Shovels and Spades.—H. M. Myers & Co...dis 30 %
Grain Scoops—Patent Cor'd Straps H., M. & Co.....dis 30 , and 75c per doz. extra
do. M. Rowland & Co., dis 30 % and 75c " "
do. O. Ames & Son, dis 17½ % and 75c " "
Sledges.—Smith's Stone or Coal Sledges—
Steel Face Polished.....₩ lb 15c
Solid Cast Steel....." 35c
Spaths and Cradles.—Seymour Mfg. Co.'s..dis 20 %
Sorghum Machinery.—Bell Cane Mills.....dis 15 %
Scantlin's Seamless Evaporators.....dis 10 %
Springs.—Cleveland Spring Co.'s—
Carriage and Express.....dis 12½ %
Blue Seat Springs.....dis 15 %
Thimble Skeins.—Whitewater's.....dis 50 %
Vises.—Solid Box.....₩ lb 10c
Wilson Mfg. Co.'s.....dis 15 %
Wheelbarrows.—Champion Iron Wheel.....₩ doz $35·00
Champion Wood Wheel.....₩ doz $3·00
" Garden.....₩ doz. $40 net
Wrenches.—Coes' Genuine.....dis 25½ %
Coes' Pattern.....dis 50 %
Wagons.—Whitewater Farm Wagons—
Thimble Skein.....3 in. $74; 3¼ in. $78; 3½ in. $79
Iron Axle.....1¾ in. $75; 1⅞ in. $81; 1 15/16 in. $88
Plow Sulkey, Buckeye.....each $31·00

St. Louis Metal Market.

(Corrected Weekly by Messrs. R. Sellew & Co.)

Tin Plate.

IC, 14x14, Best Char.	₩ 9·50	IX, 14x20, Roofing	$11·50
IX, 10x14, "	" 12·00	IC, 20x28, "	15·00
IC, 12x12, "	" 10·00	IX, 20x28, "	23·50
IX, 12x12, "	" 12·50	IC, 10x14, Coke	8·50 @ 9·00
IC, 14x20, "	" 10·00	IC, 14x20, "	9·00
IX, 14x20, "	" 13·00	IC, 10x20, "	14·00
IC, 14x20, Roofing	9·00		

Usual difference for odd sizes.

Block Tin.

Large Pigs	25c	Bars	27c
Small "	26c		

Sheet Zinc.

Casks.....₩ lb 10½c | Sheet.....₩ lb 11c

Solder.

No. 1, Refined, in bars or plate.....16c
No. 2, " " 15c
Pig Lead.....7½c
Sheet Copper.—14 to 100 lbs. Sheets 30x60.....31c
10 to 12 lbs., " " and 30x72.....32c
6 to 9 lbs., " " 33c
Tinned, 14 and 16 oz. 14x48.....32c
Planished, 14 and 16 oz. 14x48.....38c
" No. 7, 8 and 9.....41c
Copper Bottoms.....34c
Sheet Iron.—

	Common.	Smooth. Com.	Smooth Charcoal.	Smooth Juniata
No. 24	4 c	5½c	8½c	9¾c
25 & 26	4½c	5¾c	9 c	9 c
27	4¾c	6 c	9¼c	9¾c

Galvanized Iron.....dis 25 %

No. 16 to 20	12c	No. 27	15c
21 to 24	13c	28	16c
25 & 26	14c		

Russia Iron.—

Perfect	16c	No. 1 Stained	16
		In Sheets, 1c. higher	
American Russia.—		B	11c
A	13c	In sheets, 1c higher	

Lead.—Lead Pipe, in full coils 8½c
Pig.....7¾c | Lead Pipe, when cut. 9½c
Bar.....8¾c | Sheet Lead.....9¾c
Wire—Bright.....dis 40 %
Coppered.....dis

CHICAGO.

(Reported by Frank Sturges & Co., 72, 74 & 76 Lake St.)

March 10, 1876.

Tin Plate.—

10x14, IC, Ch'l. Goods		14x20, IX, Ch' Best	$13 00
10x14, IC, " Best	9 50	14x20, IXX, " "	13 50
10x14 IX, " "	12 00	14x20, IXXX, " "	18 00
12x12, IC, " "	10 00	DC, 100 Plate, " "	9 50
12x12, IX, " "	12 50	DX, " "	12 00
14x20, IC, " "	10 00	DXX, " "	14 50
Roofing IC, Charcoal, Best		DXXX, " "	17 00
Roofing IX, Charcoal "			9 00
20x28, IC, Charcoal Roofing, Com			11 50
20x28, IC, " Good			18 00
20x28, IC, " Best			18 50
20x28, IX, " "			19 00
10x14, IC, Coke Plates			23 50
14x20, IC, "			8 50 to 8 75
14x20, IC, "			9 00 to 9 50

TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others.

If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co

BETHLEHEM, PA.

ALSO,

SHIVE'S PATENT WATCHMAN'S CLOCK AND DETECTOR,

AND

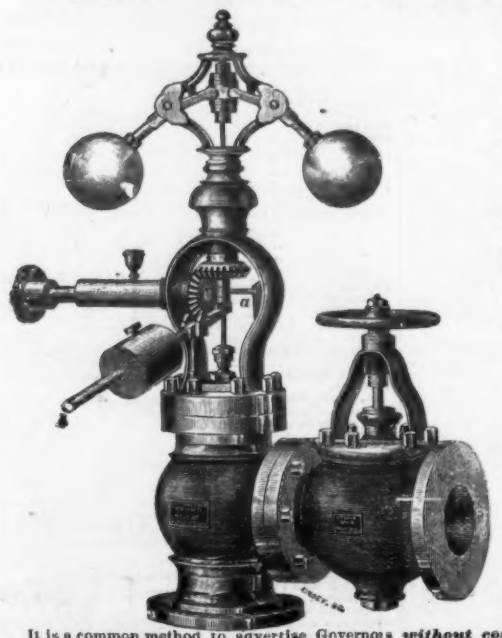
Buoy's Patent Counter Scale,

No Nest of Weights.

Circulars sent free

January 25, 1876. REDUCED PRICE LIST OF THE

JUDSON PATENT IMPROVED GOVERNORS.



☞ When Governors are ordered, be particular and say Governor with Stop Valve, or without Stop Valve; and either Plain or Bright Finish, as you may require, and with or without Lever Attachment.

For dimensions and other particulars send for Illustrated List.

Capacity of Valve or Diameter of Steam Pipe in inches.	PRICE. Plain.	Bright Finish.	Lever Attachment for altering speed.	Improved Stop Valve.
¾	17·00	19·00	1·90	..
¾	19·00	21·00	1·90	..
1	21·00	24·00	2·00	5·00
1¼	25·00	28·00	2·25	6·00
1½	29·00	33·00	2·50	8·00
2	35·00	40·00	2·75	10·00
2¼	42·00	48·00	3·25	14·00
2½	45·00	51·00	3·50	15·00
2¾	49·00	56·00	3·75	17·00
3	55·00	63·00	4·25	20·00
3½	64·00	73·00	4·50	25·00
4	74·00	84·00	5·00	30·00
4½	86·00	97·00	5·50	36·00
5	94·00	106·00	6·00	42·00
5½	112·00	125·00	6·50	48·00
6	125·00	138·00	7·00	54·00
7	150·00	165·00	8·00	68·00
8	185·00	202·00	9·00	80·00
9	205·00	225·00	10·00	..

No Charge for Boxing & Cartage.

It is a common method to advertise Governors *without cost*, unless satisfactory to the customer, and then charge *High Prices* for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacking durability. The Judson Governor is guaranteed to be not only the best Regulator of Steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the above list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

JUNIUS JUDSON & SON, Rochester, N. Y.

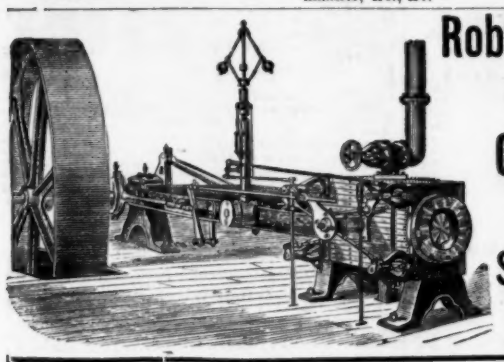
The Pratt & Whitney Co.,

Hartford, Conn.,

Have constantly on hand and making

Drop Hammers

Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



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CHESTER, PA.

Corliss Engine

BUILDERS.

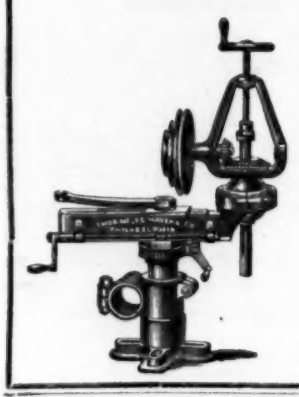
Shafting & Gearing.

Boiler Makers.

THORNE, DeHAVEN & CO.

21st Street, above Market,

PHILADELPHIA.



DRILLING MACHINES.

PORTABLE DRILLS. Driven by power in any direction, self-feed and convenient adjustment.

RADIAL DRILLS. Self-feed—large adjustable box table—separate base plate, every convenience.

VERTICAL DRILLS. Self-feeding—of new and improved designs.

MULTIPLE DRILLS. For boiler work, etc., 2 to 20 spindles, fed and returned by power or hand, together or separately.

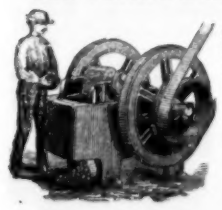
HORIZONTAL BORING AND DRILLING MACHINES. For large pieces—with boring head, adjustable, vertically and horizontally.

SPECIAL DRILLS. For special work. Gun Blank Drills, Coal Drills, &c., built to order.

BLAKE'S PATENT

STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect McADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.

Also for crushing **Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barytes, Manganese, Phosphate Rock, Plaster, Soapstone, &c.**

For Illustrated Circulars, and particulars, address,

BLAKE CRUSHER CO., New Haven Conn.

Knowles Patent Steam Pumps

MANUFACTURED BY THE

KNOWLES STEAM PUMP WORKS,

WARREN, MASS.

WAREHOUSES:

14 & 16 Federal Street, Boston, 92 & 94 Liberty Street, N. Y.

Cut above represents regular Boiler Feed Pump, No. 3 and 4. Showing New Patent Valve Motion, and Hand Power LEVER Attached and Detached.

FIRE PUMPS a specialty.

Mining Pumps (both Double Acting Plunger, and Piston Pattern,) which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best.

Every machine furnished under a complete guarantee.

THE EMPIRE

FAN BLOWING

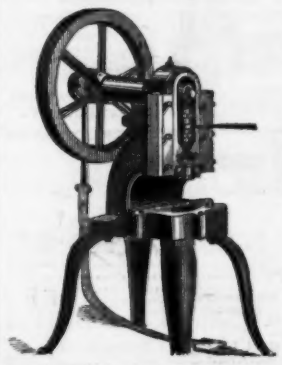
PORTABLE FORGES.

Patented in U. S. Nov. 25, 1873. Patented in Canada May 28, 1874.

COSTING FROM $16·00 TO $75·00.

We desire to call your attention to our new Forge, No. 12. They are especially convenient for Boiler Makers' repairs, weighing only 50 lbs.; they can be easily carried around the country, and will make a fire hot enough to melt ¾ or 1 inch iron in two minutes. They are a very useful tool for Machinists to set up on their work bench—always ready and handy for mending and tempering tools, and like work—and are so cheap that every mechanic can afford to complete his "kit of tools" by owning a Forge. We make 28 sizes of Portable Forge, designed for all purposes of metal working. Send for catalogue to

EMPIRE PORTABLE FORGE CO. Troy, N. Y.



A. H. MERRIMAN,

Patent Power

Punching Presses.

Patentee and Sole Manufacturer.

I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

West Meriden, Conn.

HAMMER & CO.,

Branford, Conn.,

Manufacturers of the following *Patented* Articles of

MALLEABLE IRON:

Hammer's Adjustable Clamps.
Hammer's Malleable Iron Oilers.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.

For Sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of Superior Quality made to order

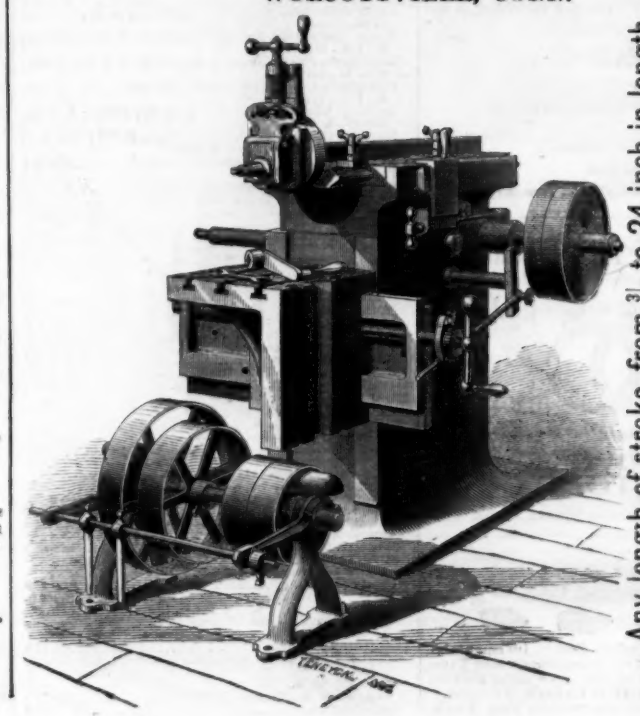
THE HENDEY MACHINE CO.

MANUFACTURERS OF

THE MANVILLE

Patent Planers and Shaping Machines.

WOLCOTTVILLE, CONN.

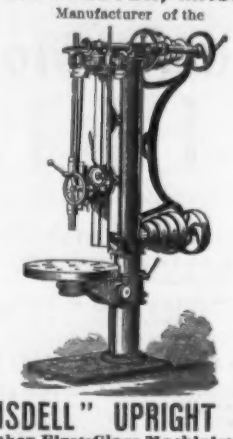


Any length of stroke from ¾ to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

P. BLAISDELL & CO.,

WORCESTER, MASS,

Manufacturer of the



"BLAISDELL" UPRIGHT DRILLS

And other First-Class Machinists' Tools.

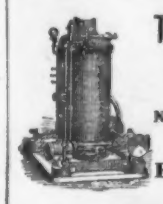
IMPROVED

Engine Lathes

SCREW MACHINES, &c.

JONES, LAMSON & CO.,

Windsor, Vt.



The Whitmore Engine.

SAFEST, CHEAPEST & BEST.

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No. 131 South Fourth Street,

PHILADELPHIA, PA.

Sole Manufacturers

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JOSEPH WALKER, Prop. H. LYONS, Manager.

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Hampson, Whitehill & Co.'s Stationary, Portable and Hoisting Steam Engines; Shive Governors, a Sure Regulator; Machinists' Tools, (the Pratt & Whitney Co.'s,) of world-wide reputation; Knowles' and Pulsometer Steam Pumps; Jones' Scales, "The Test;" Union Emery Wheels, and General Machinery.

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Pat. Machinists' Tools.

REDUCED PRICES.

Set Iron Dogs,	⅜ to 2 in	$ 5·00
" " "	⅜ to 4 in	12·00
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Iron and Steel Clamps, Die Dogs, Clamp Dogs,

Vise Clamps, Expanding Mandrels, &c.

Send for latest Price Lists to

C. W. LE COUNT,

South Norwalk, Conn.

The Brown Cotton Gin Co.

Manufacturers of

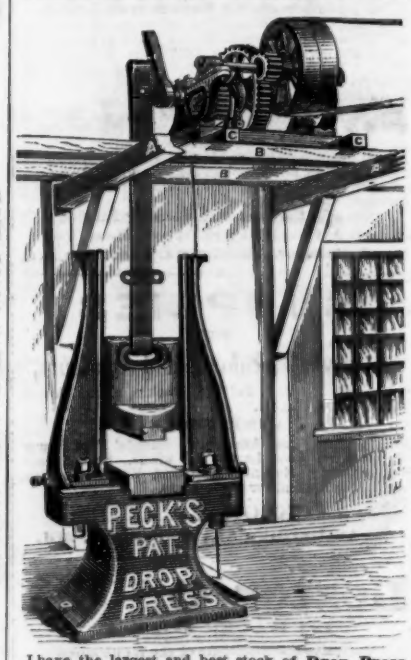
THE BROWN COTTON GIN,

Israel F. Brown's Patent

Cotton Gin Feeder & Condensers.

Also Cotton Gin Saws, Ribs and other materials for Gin makers and Repairers.

NEW LONDON, CONN.



I have the largest and best stock of **Drop Press Patterns** in the country—suitable for Forging, and all kinds of Sheet Metal work.

WHY THE BEST:

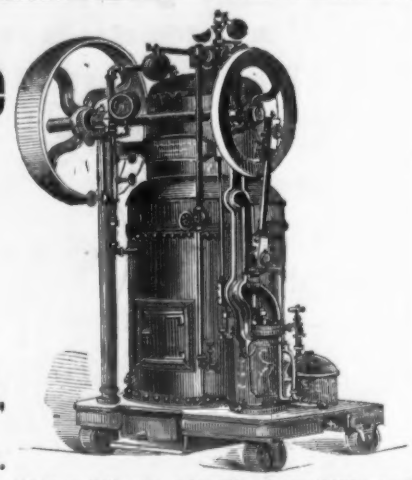
It requires less power, works faster, gives a harder blow with same weight of hammer, the rebound of the hammer is caught without lessening the force of the blow, the blow is uniform and not affected by variations in the speed of the driver. It is always in order. **The Drop Press a specialty.**

MILO PECK, New Haven Conn.

Machinery, &c.

THE

Shapley Engine



Patented Feb. 10, 1874.

COMPACT,
PRACTICAL,
DURABLE,
ECONOMICAL.

$200·00.

Cheaper than any Engine offered of the same capacity.

MANUFACTURED BY

SHAPLEY & WELLS,
Binghamton Iron Works,
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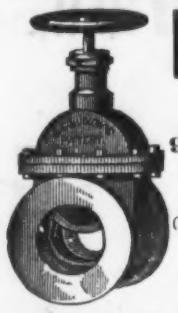
Manufacturers of **Steam Engines, Boilers, Water Wheels, Circular Saw Mills and Mill Work generally.**



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OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.,

VALVES

(Double and Single Gate, ¼ in. to 48 in.—outside and inside Screws, Indicator, &c.) for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

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(Successor to MATTHEWS & MOORE,)

Engineer, Machinist, Founder and Boilermaker

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or Composition Metals.

Sugar Mill, Saw Mill and Grist Mill Machinery,

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BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of TANK AND PLATE IRON WORK.

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MANUFACTURERS OF

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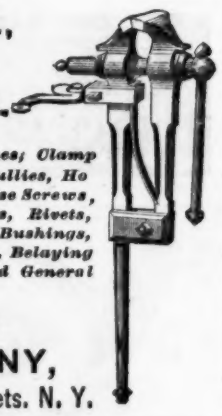

With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes; Clamp Heads and Screws; Parallel Bench Vises, Sash Pullies, Ho House Pullies, Composition Cocks, Bench Screws, Vise Screws, Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Marlin Spikes, Malleable Iron Castings, and General Hardware.

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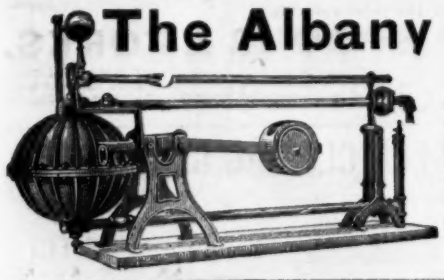
ROLLER TUBE EXPANDERS

And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

The Albany Steam Trap.



This Trap automatically drains the water of condensation from ***Heating Coils,*** and returns the same to the Boiler *whether* the Coils are *above or below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
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SAMUEL A. GODDARD & CO.,

Commission Merchants and General Agents,

execute orders for British manufacturers on the lowest terms, and collect and forward goods for a very moderate payment. Agents for the sale of North Staffordshire Iron of a standard quality.

THE EXCELSIOR DRY LEVEL.—Patented.

Works by gravity; warranted true; no glass to break; does not get out of order easily; graduated for degrees and feet and inches. Prices, $1·50 to $10, according to style and finish. For sale wholesale and retail by **H. S. TARR & SON, 710 Green St., Phila.**

Machinery, &c.

Established 1848.

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Engineers, Iron Founders and Machinists.

RAILWAY SHOP EQUIPMENTS.

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters

Are of Improved and Patented Construction.

Railway Turning and Transfer Tables,

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POWER LOOMS,

SPOOLING, BEAMING, DYEING and Sizing Machines.

PATENT BOBBIN WINDING MACHINES
wind direct from hank or skein to shuttle bobbin.

SHAFTING

With Patent Adjustable self-oiling Bearings.

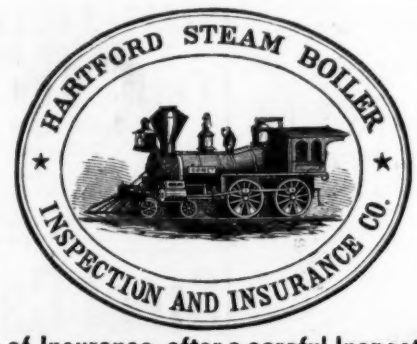
Adjustable Self-Oiling Hangers,
8, 10, 12, 15 and 18 in. drop,

Ball and Socket Self-Oiling Pillow Blocks.
Pulleys, from 4 inch to 10 feet in diameter.
Pulleys made in two parts, any size required.

SELF-ACTING WOOL-SCOURING MACHINES,
LARD AND PARAFFINE OIL PRESSES.
Improved Power Hoisting Machines.
Machine and Foundry Work in all their branches.

Plans taken, and Factories fitted out complete with shafting and Gearing

Send for list of Pulleys, &c.
THOMAS WOOD.



Issues Policies of Insurance after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS

Full information concerning the plan of the Company's operations can be obtained at the

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BUILDERS OF STEAM DREDGING MACHINES,

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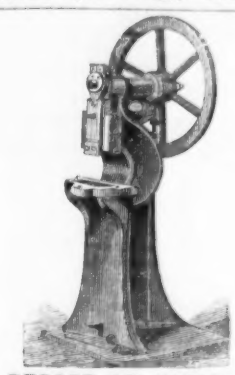


REPORT OF JUDGES

In Department V, Group 3, at the 44th Exhibition of the

AMERICAN INSTITUTE,

Held in the City of New York, Oct., 1875.

No. 318, Drawing, Drop & Punching Presses.

THE STILES & PARKER PRESS CO.,
Of Middletown, Conn.

The machinery exhibited by these makers is of a character that calls for special commendation. In addition to their well known punching presses, to which a new feature has been added in a press adjustable to an inclination for discharging work left above the die, there are exhibited by them a combined punch and shears, a drawing or blanking press, and a drop.

In all these there is shown the highest mechanical culture, applied to meet every practical requirement, to avoid every practical difficulty, and to enlarge the range of application of the machines, by devices which are at once simple, elegant, and effective.

Your committee would unhesitatingly recommend for this exhibition the "Medal of Progress," but find such award debarred by Rule of the Institute, forbidding such award unless a Silver Medal has been previously awarded. We, therefore, respectfully recommend the award of a Silver Medal.

Silver Medal Awarded.

A true copy from the Report on file.

JOHN W. CHAMBERS, Sec'y.

AQUOMETER Steam Pump.

Highest Premium awarded by Franklin Institute, 1874,

For Simplicity, Economy of Construction & Efficiency.

An absolutely Durable, Cheap, Efficient and Economical Steam Pump. Requires no special care or lubricating. Warranted. Address for circular,

AQOMETER STEAM PUMP CO.,
10 South Dela. Avenue, Philadelphia,

EUREKA SAFETY POWER!

Practically **impossible to explode.** Tested to 300 lbs. pressure per square inch. Will slit 2 inch seasoned oak—grind 8 bushels Corn per hour. **Price $250.** Also, Stationary Engines and Boilers and **Spark Arresting Portable Engines** for plantation use. Send for our circular. Discount to the trade,

B. W. PAYNE & SONS,
Corning, N. Y.

The Frazer Axle Grease and Lubricator.

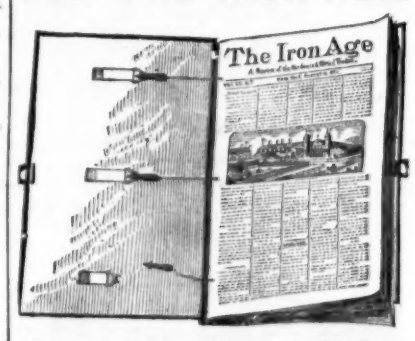
A pure Lubricator, free from water, gum or sediment. The best article made for ***Wagons, Open Journals, Cog Wheels Rollers*** and wherever a ***Solid Lubricator*** or ***Grease*** can be applied. Put up in Boxes, Kegs and Barrels. For prices see New York Price List in this paper.

Established 10 years.

Frazer Lubricator Company,
104 Malden Lane, New York,

Get Binders

FOR THE IRON AGE.



We have made arrangements to furnish Koch's Patent Binder, which we think altogether the best before the public, to our subscribers at the following very low rates—about the wholesale prices by the dozen.

Half Cloth.....**$1·00 each.**
(Cloth Back and Corners, with Morocco Paper Sides—a good, serviceable Binder.)

Full Cloth.....**150**
(Morocco Cloth Back and Sides.)

Half Morocco.....**200 "**
(Morocco Back and Corners; Cloth Sides.)

The above are all in black, which is the most serviceable color, with the exception of the Half Morocco, which are put up in a number of handsome shades. The name of the paper is stamped in gold on either side, and each Binder is furnished with loops by which it can be hung up against the wall as newspaper files are usually disposed of.

TUBAL SMELTING WORKS,

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.

XXX Genuine	40c	C	20c
XX	38c	D	15c
X	35c	E	13c
A	30c	F	11c
B	25c		

"Note."—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

BRASS CASTINGS, 21 to 35c. | INGOT BRASS, 19 to 28c. | BRASS TURNINGS AND OLD METALS WANTED.

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,

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P. O. Address: Frankford, Philad'a. MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.

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BESSEMER SHOVEL AND PLOW STEEL.
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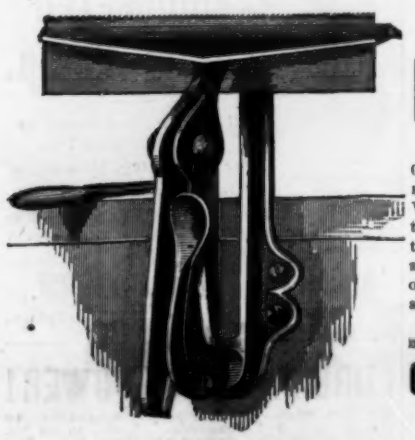
RE-ROLLED NORWAY SHAPES.
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.



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No. 0 Saw Vise

We would call the attention of dealers to our No. 0 Saw Vise, which we have placed upon the market, not as a substitute for our well known No. 1 Saw Vise, but to compete with other cheap Vises. Although it is sold at a very low price, little more than the cost of casting, still it possesses many of the advantages which establish our Saw Vises over all others in the market; viz.: combined power of lever and cam.

Send for illustrated catalogue and 1876 supplement to

GEO. N. STEARNS & CO.,
SYRACUSE, N. Y.

JOHN C. JEWETT AND SONS'

ESTABLISHED IN 1849.

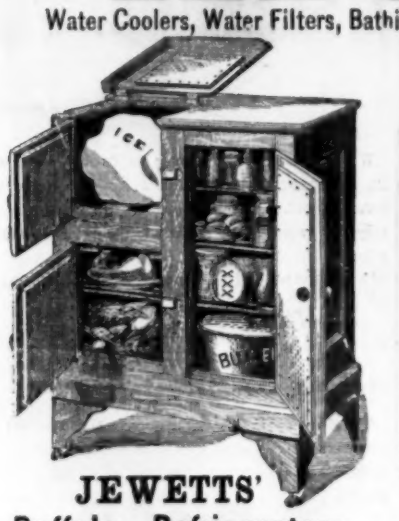
BUFFALO, N. Y.

MANUFACTURERS OF

Also JAPANNED & BRIGHT BRASS

BIRD CAGES,

Water Coolers, Water Filters, Bathing Apparatus, Tea Trays, &c., &c.



JEWETTS'
Buffalo Refrigerators.

Jewett's Patent

Filter

WITH

PORCELAIN LINED

COOLER.

Acknowledged the only Complete Filter and Cooler in the world.

Hardware, House-furnishing and Crockery dealers can find no more salable article, as this Filter is perfect in its work of purifying water of every kind, attractive in appearance, &c., &c.

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Manufactured only by

JOHN C. JEWETT & SONS,
Buffalo, New York.

Send for copy of our Splendid Centennial Catalogue.

NEW TIME TABLE.

Great Reduction in Time and Labor to the Farmer by using

Nellis' Original

HARPOON HORSE HAY FORK,

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Grapple and Pulleys; also, Nellis' Patent Stacker and Method of conveying Hay, Straw, &c. A ton of Hay can be delivered in three to five minutes to any part of Mow or Stack. The right of Stacker and Conveyer granted FREE to the Farmer purchasing our Horse Hay Fork and Fixtures during season of 1875.

With it Pulleys can be attached or detached to rafter or beam, without the use of a ladder.

NELLIS' PULLEY,

Improved Wrought Frame, Prepared Wood Wheel. Warranted superior to any Horse Fork Pulley offered in the market.

A trial of these goods will convince any farmer that he cannot afford to dispense with them, as their entire cost is often times saved by a single day's use.

Also manufacturers of all descriptions

Of Agricultural Steel & Iron,

Steel Tempered by Nellis' process to suit every kind of soil.

Prices and descriptive Catalogues of our goods furnished free. Address,

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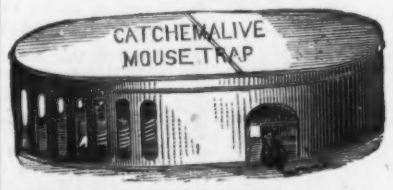
General Agents for the Southwest.

ESTABLISHED 1840.

R. E. DIETZ,

No. 54 & 56 Fulton, and
29 & 31 Cliff Street, New York,

Manufacturer of the



Each mouse caught resets the Trap for another.

TUBULAR

And Other

Patent Lanterns

BRASS AND IRON

Jack Chains.

STANLEY G. FLAGG & CO.

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Office and Warehouse,
No. 216 & 218 N. THIRD ST.

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STEEL CASTINGS.

A Substitute for Steel and Wrought Forgings.

☞ Circulars sent on application. ☜

Steel Castings

We make Steel Castings true to pattern, sound and strong. Can be worked same as bar steel. Plowshares, Mold-boards and Land-sides, Anthracite Coal-breaker Teeth, Wheels and Pinions, Dies and Hammer Heads, Engine and Machinery Castings of all descriptions, Railroad Frogs and Crossings.

Invaluable for all articles requiring great strength and durability.

Send for Circular.

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Crucible Steel Casting Co

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Cast Steel Castings.

Light and Heavy Castings made on short notice. Solid, ductile, true to pattern, can be readily forged and tempered. *Post Office Box 733.*

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UNIFORM SPEED

WARRANTED THE MOST PERFECT GOVERNOR IN THE WORLD

However great or violent may be the change of load We will warrant any positive Uniform speed of Engine desired.

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"Lowest Priced and BEST."

Do Your Own Printing!

$3 Press for cards, labels, envelopes, etc. Larger sizes for larger work.

Business Men do their printing and advertising, save money and increase trade. Pleasure and profit in Amateur Printing. The Girls or Boys have great fun and make money fast at printing. Send two stamps for full catalogue of presses, type, etc., to the Manufacturers,

KELSEY & CO., Meriden, Conn.

Printing Presses

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Improved French Casters

The simplest in construction and most reliable ever offered to the public. Can be put on in half the time, and more permanently than the ordinary kinds. Send for Illustrated Catalogue.

JOHN TOLER, SONS & CO.,
Newark, N. J.

Small Gray Iron and Brass Castings.

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Brass Works,

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Manufacturer of Brass Work for Water, Gas and Steam. Brass Castings and Jobbing promptly attended

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REDFIELD, BOWEN & WALWORTH CO.,

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Steam, Gas AND Water Work Supplies.

BOILER MAKERS' Supplies.

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MALLEABLE, GRAY Iron & Brass CASTINGS To Order.

SALESROOMS: 112, 114 and 116 LAKE STREET,
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Manufacturers of

Carriage, Tire, Plow, Stove AND OTHER BOLTS.

Carriage Bolts made from Best Square Iron, a Specialty.

UNION SPRING HINGES.

DOUBLE OR SINGLE ACTING.

Especially adapted for Mosquito, Fly and Screen Doors.

Size 2½x2½, Japanned, with Nickel Plated Springs—giving a neat finish to a door.

Single Acting, Per Pair - - $1·00
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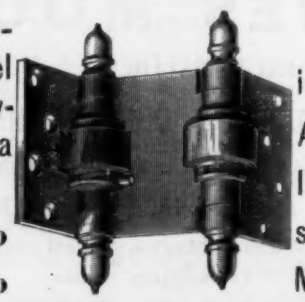

To dealers ordering 4 pairs Double Acting, of this size, I will give a handsome Black Walnut Model.

The DOUBLE ACTING UNION SPRING HINGE is the best and cheapest appliance known for swinging a light door both ways.

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THE HULL & BELDEN CO.,

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Wrought Iron & Steel

Drop Forgings,

FINE AND CLOSE WORK FOR

Guns, Pistols, Sewing Machines and other fine Tools and Machines, Wrenches,

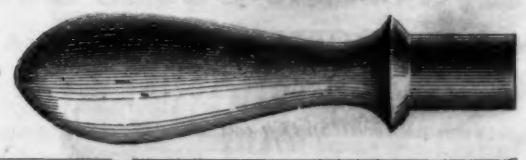
CLAMP & THUMB SCREWS, CARRIAGE IRONS AGRICULTURAL & OTHER IMPLEMENTS, &c., &c., at reasonable prices.

IN STOCK,

Machine Handles,

(SEVEN SIZES)

Both Finished & Rough.



DERBY SILVER CO., Derby, Conn.,

Manufacture the most reliable

SILVER PLATED SPOONS & FORKS.

They are plated by weight, and not by time or guess, containing 20 per cent. more silver than the usual standard, on a base of Nickel Silver, and finished by hand. Each article is guaranteed by the trade mark and warranted to give full satisfaction. We ask of the trade a fair and impartial test, assuring them that the high standard already attained, shall be maintained. Send for Catalogue and Price.

SCHOFIELD'S PATENT SELF-CLOSING GAUGE COCK.

SIMPLE IN Construction.

PERFECT IN OPERATION,

The discharge of Steam and Water is directly downward and clear of engineer. Can be easily Reseated. They have holes in handle to put rod in when cocks are out of reach of engineer. Warranted to give satisfaction.

PRICE ONLY $3 PER SET.

HENRY C. MEYER & CO., Manufacturers of BRASS WORK for Water, Gas and Steam
Importers and Dealers in PLUMBERS' MATERIALS, 46 & 48 Cliff Street, N. Y.